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## A Lecture in a Wheat Field.

By PROFESSOR W. FREAM, B.Sc.

We have been favored by Professor Fream with the following report:

On Saturday, the 14th Aug., at the Wiltshire and Hants Agricultural College, Downton, Salisbury, Professor W. Fream, B.Sc., gave a very interesting lecture on "Wheat" in one of the corn-fields on the large farm belonging to the College. He said his object was to bring before his students, in the presence of the ripe crop, the most salient points of the information about wheat, which it had been his duty from time to time to impart to them during the pleasant session which was now drawing to a close. Pulling a plant up from the soil, he showed that the wheat plant has no true root in the botanical sense of the term, that it has no structure comparable with the well-developed tap-root of the carrot, parsnip, radish, mangold, turnip, or swede, because very early in the life of the plant the root ceases to grow, but from it are developed a large number of delicate fibres admirably suited to find their way through the soil. These adventitious rootlets were the sole means the plant possessed of obtaining mineral food from the soil; their free growing ends consisted of delicate cellular tissue which was continually dividing and forming new cells, and which was protected from rude contact with the coarse earth by a delicate cap of cells—the pilicrhiza—with which the growing point provided itself. Under the most searching microscopic examination, the walls of the cells of the fine rootlets appeared quite entire, and yet they knew that through those walls there passed into the plant watery solutions of mineral matters obtained from the soil, and on which the nutrition and growth of the plant were utterly dependent. Potash, lime, magnesia, iron, nitrogen, phosphorus, and sulphur, all of which were absolutely necessary, passed into the plant in solutions of various mineral salts which were absorbed by the busy rootlets. Ever since the young wheat-plant commenced its growth, these rootlets had been at work foraging, as it were, in the soil, and selecting in a mysterious way he could not explain, just those substances which the plant required for its sustenance. Besides its physiological action the fibrous root had a mechanical duty to perform, that of holding the plant firmly in the soil. They would notice how the little lumps of soil clogged the rootlet before them, and the difficulty with which they were removed without injuring the tissues; this closeness of application was also due to the energy of the rootlet, and without it such a slender plant as wheat would be at the mercy of every wind which blew. The practice of agriculture unconsciously took advantage of this fact, for they were familiar with the common practice of rolling a young wheat crop when about an inch high, this gave the soil a closer texture, and, by bringing more particles of earth within the sphere of operations of the growing end of each rootlet, enabled the entire plant to secure a firmer grip on the soil.

Passing on to the aerial part of the plant, the Professor noticed the stout "collar" at the place where the stem and rootlets appeared to meet. The ascending stem or culm was hollow, save at the prominent thickening on the stem whence the leaves or flags arose; a cross section showed that at these thickened parts or "nodes" the stem was solid; the leaf, moreover, consisted of two parts, a free lamina or blade, and a sheath closely surrounding the stem, and split all down the front; the leaf stalk or petiole was entirely absent. Bending the leaf blade down at its junction with the stem he showed them the withered membranous ligule, and reminded them of the characters of the ligule whereby he had taught them months before how to distinguish between young plants of wheat,

barley, and oats, long before they came into ear. The leaves, like those of all cereals and grasses, were alternately arranged, and though now they were getting blanched and withered they must remember that the leaves had worked as hard and as unceasingly as the rootlets in the preparation of the plump ears of corn which were now being harvested. If, as soon as the wheat came into ear, all the leaves of the plant were carefully cut away, there would be no grain; the functions of the roots could only be properly performed in co-operation with the leaves, and without the latter the plant would become disorganised and die. In the operation of "flagging" one evil is incurred for the removal of a greater one. By the process of transpiration which took place at the leaves there was got rid of the surplus of water which entered at the roots as the vehicle whereby mineral food was introduced into the plant. Moreover, it was through the leaves that the gaseous food of the plant, the carbonic acid gas of the atmosphere, passed in and yielded up its carbon, and they would remember that the plant obtained carbon in no other way. Arriving at the ear, he reminded them of the many times they had dissected this structure when in flower, and now asked them to note what changes had taken place. Taking a solitary spikelet, they saw that the two outer empty glumes still remained, and that the flowering glume and pale of the five or six florets were still left; in each of the three lower florets they found a grain; frequently they found one in the fourth floret, and very rarely in the fifth. The object of the cultivator, of course, was to get all the florets filled. Looking into a fertile floret they saw that no trace remained of the two minute lodicules which were palpable enough in the flower, and that the three stamens had entirely disappeared, while the lovely style and stigma which had so excited their admiration in the flower were only represented by a whitish silky trace on the top of the grain. What, then, was the wheat grain? Obviously the ripened ovary, and therefore the fruit of the wheat plant. They knew it to be that form of fruit which botanists termed a caryopsis, and from their comparative studies of various fruits they were aware that the seed of the wheat was obtained by peeling off the outer skin, or pericarp, of the ordinary grain, which really consisted of three delicate layers. The seed itself had two coats, the outer or testa, and the inner or endopleura, in which was enclosed a large floury endosperm, formed chiefly of starch, with a small embryo situated laterally at its base. During the last fortnight the color of the crop had been about the same as it was then, and the straw seemed dry and dead. As a matter of fact, during this period the plant had drawn little or nothing from the soil, but the nutrient materials from the entire plant had migrated upwards into the grains of wheat. This is the explanation of the well-known fact that if wheat is cut before it is quite ripe, it will, nevertheless, if there be plenty of straw, ripen after the cutting. The grain ripened in this way is, however, crinkled, and not so plump, and not quite so heavy per bushel as grain well-ripened in fine weather. As a proof of this migration, he mentioned an experiment in which the ash of the waving stalk and ear gave 49 per cent. of potash, while the fifth leaf below the ear only gave 12 per cent. The same fact was supported by a comparison of the relative weights of straw and grain at different dates. Thus an experimenter found that on July 6th a certain quantity of freshly-cut corn weighed 1,587 kilogrammes, and of this the grain weighed 755 kilogrammes, or nearly one-half; whereas on July 26th a weight of 2,785 kilogrammes of freshly-cut corn yielded 2,070 kilogrammes of grain; or nearly three-quarters. Hence, during the last three weeks before cutting, the increase is almost entirely confined to the grain. Their own

crops had recently experienced a week of bad weather, and although the majority of the grains were round and plump, they found here and there a longer crinkled grain which, but for the bad weather, might have been normally developed. The attenuated grains when broken across were seen to be somewhat translucent; this was owing to their containing 2 per cent. more albuminoid matter than the plumper grains, which had 2 per cent. more starch. A wheat grain depends for specific gravity on the nitrogenous or albuminoid substances in it, while its actual weight in bulk depends on the roundness of the grain and therefore on the way it lies in the bushel. The average specific gravity of good starchy wheat was 1.385, and of a hard Russian wheat 1.407. The weight per bushel is better in a good than in a bad season, because in the former the grain is rounder and plumper. Long Polish wheat with a specific gravity of 1.407 only weighed 56.9 lbs. per bushel, while round English wheat with a lower specific gravity of 1.384 nevertheless weighed 62.6 per bushel. In such a treacherous climate as ours the time of cutting will be determined chiefly by the state of the weather, but wheat should, if possible, be cut when "ripe," and not allowed to stand till "dead-ripe." In becoming dead-ripe all the changes are for the worse; thus, 6.3 per cent. of starch and sugar in ripe wheat sink down to 3.5 per cent. in dead-ripe, 0.6 of soluble aluminoids decrease to 0.1 per cent.; while, on the other hand, 78 per cent. of crude woody fibre in the ripe plant mount up to 82.2 per cent. in that which is dead-ripe.

It seemed to be a rule that the greater the antiquity of a crop, and consequently the more artificial the conditions under which it was grown, the more liable did it become to the ravages of parasitic pests, both insect and fungal. He knew of no crop which had so many insidious foes working against it as the wheat crop. Happily, the attacks were this year few and far between on the College Farm. He was able to show them in a few cases, the little orange-yellow maggots, which are the larvae of the red gum, or wheat-midge, *Cecidomyia Tritici*, and which sometimes aggregate in numbers up to twenty or more on the young grain, and completely destroy it, leaving the plant to be harvested for its straw only. Then the *Vibrio Tritici*, or wheat eel, was a most prolific little pest which also attacked the ovary, the young grain becoming filled with multitudes of these organisms, and its outer coats becoming coloured black, and so producing the appearance known as "ear cockles" or "burnt corn." After a long search he had only been able to find one specimen of "ear cockles," but the blotched bases of the glumes, and the deformed and puckered grains would enable them to identify the work of the vibrio in the future. Of smut, *Ustilago carbo*, and of bunt, *Tilletia caries*, they had seen but little; they both attacked the glumes and grain, filling the latter either with a black, greasy evil-smelling substance, or with a sooty powder. On the other hand, they would notice on the straw abundant indications of rust, *Puccinia graminis*, the reddish and brownish spores of which were seen breaking through the epidermis of the straw in irregular longitudinal lines. Rust never attacked the grain, although it affected it indirectly, for in its parasitism on the culm and leaves, it impaired the functional activity of the latter, and therefore the grain from defective nourishment became "thin" and boat-shaped. Fortunately these plants were so well forward before the wet weather favouring the rust set in, that the grains showed no perceptible signs of its presence. Rust was very generally referred to under the name of mildew, but the Professor hoped this latter term would in future be restricted to the delicate cobweb-like parasites which the leading fungologists denoted by the term. One other enemy of the wheat

plant, namely, the ergot, *Claviceps purpurea*, was not very common, rye being its favourite victim. As they knew, however, it was an exceedingly dangerous parasite, and if present in quantity would ruin the entire crop. The black cocks-pur-like appearance of an ergoted grain was quite unmistakable, and the man who willingly passed it by in a corn crop was a criminal. He had searched vainly for an ergoted wheat ear, but it was not till the preceding Wednesday, when they were all engaged in valuing the standing cereals on the farm, that the sharp eye of his colleague, Professor Curtis, detected the specimen he now showed them. The remarkable life histories of these wheat pests, and such means as were known for their prevention or cure, would be dealt with at another time.

Lastly, he noticed the weeds that had accompanied the crop. The bindweed, *Convolvulus arvensis*, and its namesake, the climbing bistort, *Polygonum Convolvulus*, had spirally ascended the wheat culms and formed with their free ends graceful festoons. On the ground where the wheat had been cut they saw an abundance of knot-grass, *Polygonum aviculare*, which, as its name phonetically indicated, was not grass at all, and also the snakeweed, *Polygonum Bistorta*. That most persistent and aggravating weed-pest, the couch-grass, *Triticum repens*, was defiantly showing its flowers as though it meant to let the whole world know that it was own brother to the wheat plant, *Triticum vulgare*. It was sad to think that such a noble genus as *Triticum* should include such a scapegrace as couch-grass! The poppy, charlock, campion, pimpernel, feverfew, and a host of other weeds he had kept before the students' notice all the summer, and he hoped they now not only knew the fruits, but were sufficiently familiar with the seeds to be able to detect these latter in all samples of seed intended for sowing. By thoroughly cleaning their land, and by employing nothing but clean and pure seed, farmers would place it beyond the range of possibility for their choicest crops to be invaded by such armies of charlock and poppies as had gained a footing over most of the country during the present season. The more weeds the soil had to nourish the less chance was there for the crop, so it was to the farmer's direct interest to make himself acquainted with the seeds of notoriously evil weeds. To subdue a foe it is necessary first to know him and recognise him.

After the lecture the Professor and students set to work in the wheat-field, and showed that a heavy day at harvesting was by no means incompatible with the digestion of intellectual food of the best kind.—*The Miller*. (London.)

THE Post-office officials at Washington have prepared a statement giving the amount of matter sent from the United States to Europe during the fiscal year ending June 30, last. It shows that we sent to Great Britain and Ireland 126,468 pounds of letters, and 558,600 pounds of second class matter; to Germany, 64,430 pounds of letters and 241,920 pounds of second class matter; to France, 19,991 pounds of letters and 91,322 pounds of second class matter; to Italy, 6,728 pounds of letters and 39,623 pounds second class matter; to Belgium, 2,384 pounds of letters and 10,552 pounds of second class matter; to Denmark, 3,011 pounds of letters and 8,868 pounds of second class matter; to the Netherlands, 3,679 pounds of letters and 11,948 pounds of second class matter; to Switzerland, 4,860 pounds of letters and 22,685 pounds of second class matter; to Spain, 1,824 pounds of letters and 14,400 pounds of second class matter; to Sweden, 8,859 pounds of letters and 16,372 pounds of second class matter; to Norway, 6,201 pounds of letters and 9,999 pounds of second class matter. Total amount of first-class matter, 248,385 pounds; total amount of second class matter, 1,021,240 pounds.



## NEWS. EVERYBODY READS THIS.

ITEMS GATHERED FROM CORRESPONDENTS, TELEGRAMS AND EXCHANGES.

Reblitz Bros. new 60 barrel mill will start up soon.

White Bros. are building an elevator at Hokah, Minn.

An oat meal mill project is on foot at Maquoketa, Ia.

Sessinghouse, a St. Louis miller, is a candidate for congress.

Lanesboro, Minn. is soon to possess a first class oat meal mill.

The floods did great damage in portion of Iowa, about Sept. 20.

The Des Moines, Ia., Glucose Co., will use 3000 bushels of corn per day.

Samuel Lamer, of Belleville, Ont., is fitting up a first-class new process mill.

Philip Ergeman's flour mill at Rockport, Ind., burned Sept. 4. Total loss.

Another good flouring mill can find plenty work at Cawker City, Kansas.

Wm. Van Eppe is adding two run of stone to a mill at Dell Rapids, Dakota.

A flouring mill will probably be built soon at Flat Rock, Oconto County, Wis.

The mill at Valley City, Dak., is to have a new water-wheel and new machinery.

The Mankato mill at Mankato, Minn., has been fitted up on the Hungarian plan.

R. Stoops, Lebanon, Ind., is making extensive additions and changes in his mill.

H. C. Chubb, Edson, Chippewa County, Wis., is about to build a three-run grist mill.

G. W. Bishop's mill at Walton, Ind., burned Sept. 3. Loss \$10,000. Fire caused by a hot box.

Ingram & Ratliff, Princeton, Kentucky, have ordered one 26-inch mill from Simpson & Gault.

Harry Blaker, of Zumbrota, Minn., is putting in bran rolls, bought of Ewd. P. Allis & Co.

M. Spangler, of Cleveland, is putting in one of Simpson & Gault's No. 4 warehouse separators.

Krebs & Co., of Huntingdon, Ind., have ordered a "Champion" smutter of Simpson & Gault.

Edward Heller, a well-known Janesville millwright, died suddenly Sept. 25, at Wabash, Minn.

Peter Netz, of Sulphur Springs, Ind., is about to erect a first-class flour mill at that place.

A. D. Ellsworth, of Minnesota City, is introducing the roller system in his mill at that place.

W. H. Allen, of Winona, Minn., is going to build a two-story flouring mill at Lake Benton, Minn.

Hobart, of Minneapolis, and B. & E. Dickey, are about to build a flouring mill on Elk River, Minn.

Paige & Todd's new mill at Fergus Falls, Minn., will have a capacity of 280 barrels per day.

John Klem, of Allendale, Ill., has ordered two of Simpson & Gault's "Snow Flake" purifiers.

A great number of grain elevators are being built on the lines of railroads all through the Great West.

C. H. Snyder & Son of Blacks Mills, N. J., is putting in the Wegmann Patent Porcelain roller mills.

Hanert & Wambold, of Appleton, Wis., have just added \$9000 worth of machinery to their flour mill.

Quackenbush's steam flour mill at Charleston, S. C., burned Sept. 9. Loss \$14,000; insurance \$9,500.

P. L. Schmidt's steam flour mill at Utica, Mo., was burned Sept. 4. Loss \$6000. Insurance \$2500.

Chris. Single, of Georgetown, O., has ordered two 42-inch buhrs, gearing, etc., from Simpson & Gault.

Peter James of Rockford, Ill., is putting in a 12x30 Reynold's Corliss engine, bought of Ewd. P. Allis & Co.

New mills are being built at New Castle, Ind., and Young America, Minn., the latter by Ackerman Bros.

The "Chicago Times" Co. have ordered a 20x42 Reynold's Corliss engine of Ewd. P. Allis & Co., Milwaukee.

G. F. Foreman, of Russellville, Ind., is putting new cloth on his reels. Simpson & Gault are furnishing the same.

Densher & Co., malsters, of Hamilton, have ordered one of Simpson & Gault's large No. 4 smutters, for cleaning malt.

Leib & Co., Rockport, Ind., have ordered of Simpson & Gault, a run of 42-inch buhrs, also a 36-inch middlings mill.

Williams, Fall & Co., of Whalen, Minn., have ordered 2 more of the Gray corrugated rolls from Ewd. P. Allis & Co.

C. A. Pillsbury & Co. have ordered 80 of the Gray's Patent noiseless roller mills for the new Pillsbury "A" mill, at Minneapolis.

D. Potts & Co., of Cherry Fork, O., are putting in a No. 0 "Champion" smutter, new cloths, etc., furnished by Simpson & Gault.

Kurth's Cackle Separator, manufactured in Milwaukee, was on exhibition at the late Minneapolis fair and was awarded a diploma.

John Rhine, New Castle, Ind., has ordered the stones and machinery for his new 6 run mill, from Ewd. P. Allis & Co., Milwaukee, Wis.

Sidle, Fletcher, Holmes & Co., of Minneapolis, have given Allis & Co., of Milwaukee, another large order for the Gray Pat. roller mills.

G. W. Dellinger, of Ripon, Wis., is putting in the Gray Patent bran rolls in his new mill. Ewd. P. Allis & Co., of Milwaukee, have the order.

C. A. Pillsbury & Co. have ordered 80 of Grays patent roller mills of Ewd. P. Allis & Co., Milwaukee, for their new A mill at Minneapolis.

H. Lackman & Co., United States Brewery, at Cincinnati, O., have just put in 2 of Simpson & Gault's warehouse separators, for cleaning barley.

Simpson & Gault are building a complete 3-run mill for H. Bartlett, Buffalo Valley, Tenn. The machinery to be all of their own manufacture.

Geo. V. Hecker & Co., of New York, have ordered a complete set of Gray's patent reduction rolls from Ewd. P. Allis & Co., Milwaukee, Wis.

The large 1000 horse-power Reynold's Corliss engine lately put in the Joliet Steel Co.'s Works at Joliet, Ill., by Ewd. P. Allis & Co., is about ready to start up.

A mill-stone exploded in Marshall & Kennedy's mill at Pittsburgh, Pa., Sept. 7, and killed S. B. Manning and seriously injured two other employees.

The flouring mill of Messrs. Blumes & Son at Douglas Centre, Marquette Co., Wis., was burned Sept. 12. Loss \$7000. No insurance. Cause of fire unknown.

The grain elevator and warehouse of O. P. Chaney, at Canal Winchester, was destroyed Sept. 29. Loss, about \$15,000, which is probably covered by insurance.

The Cackle Separator Mfg. Co., Milwaukee, have recently received heavy orders for their machines from C. A. Pillsbury and Ex. Gov. Washburn, of Minneapolis.

Ewd. P. Allis & Co., Milwaukee, have 700 men now on their pay roll. Their specialties are roller mills, Reynolds-Corliss engines and general flour mill machinery.

Isaac Staples, of Stillwater, is putting in the Gray Patent rolls, bought of Ewd. P. Allis & Co., Milwaukee. He is going to change over his mill to the Roller system.

Messrs. Notbohm Bros. of Janesville, Wis., are fitting up with the new Stevens Roller system. J. T. Noye & Sons of Buffalo, N. Y., furnish all the new machinery.

W. D. Washburn & Co., of Minneapolis, have ordered a 26x48 inch Reynold's Corliss engine and 4 boilers from Ewd. P. Allis & Co. This is to drive their Anoka mill.

C. A. Pillsbury & Co., of Minneapolis, are changing their Empire mill to a roller mill to have a capacity of 500 barrels per day. R. L. Downton's roller mills will be used.

Syria's first railroad is just finished. It has steel tracks. No men are allowed in the ladies' car, even the conductor being obliged to collect fares from it through a hole in the side.

G. S. Staley, Carmi, Ill., is remodeling his mill and is adding 2 Snow Flake purifiers, 1 Champion separator and a Champion brush. Simpson & Gault are furnishing the machinery.

The Brewers seem to be interested in the warehouse separator made by Simpson & Gault as several of them have ordered the largest sizes made, for cleaning barley.

The brick chimney of the Phoenix mills, Milwaukee, is now being moved a distance of

110 feet. 90 feet has already been made safely. The chimney is about 90 feet in height.

During the month of August 1878, 41,260 barrels of flour were shipped from Minneapolis. During the same month in 1879, 187,670 barrels and in August, 1880, 197,826 barrels.

Messrs. Kimberly, Clark & Co., of Appleton, Wis., will have their paper bag mill completed soon, probably ready for business by January. It will be the only paper bag mill in Wisconsin.

The Geo. T. Smith Purifier Co. are putting in their model mill, at Albion, Mich., several of Gray's patent corrugated and porcelain roller mills, bought of Ewd. P. Allis & Co., Milwaukee, Wis.

Geo. Hackney, supt. of the Atchison, Topeka & Santa Fe R. R. Co., has purchased the 200 horse-power Reynold's Corliss engine lately exhibited at the Millers Int. Exhibition in Cincinnati, by Ewd. P. Allis & Co.

Ewd. P. Allis & Co., Milwaukee, Wis., have an order from the Natchez Cotton Mills Co., and the Rosalie Yarn Mills, both of Natchez, Miss., for 2 Reynold's Corliss engines, 24 inch bore and 48 inch stroke, and 6 boilers.

Stevenson & Co., Ridgeway, O., are making additional improvements in their mill and are putting in a Champion separator, four real chest, new cloths for their old reels, new buhrs, etc. Simpson & Gault are doing the work.

E. Sanderson & Co., of Milwaukee, are changing over their mill to a full roller mill of 1400 bbl. daily capacity. They are putting in 50 of the Gray Patent noiseless corrugated roller mills. Ewd. P. Allis & Co. have contract for the entire job.

D. Welsheimer, of Greenfield, O., is about remodeling his mill, and has ordered of Simpson & Gault 16 reel chests, two 22-inch middlings mills, 4-run of 42-inch stones, smutters, purifiers, etc. This will be one of the best mills in that section of the State.

D. S. Shellabarger & Co. of Decatur, Ill., are changing over their new mill to the gradual reduction roller system. They are putting in the Gray's Patent corrugated rolls. Ewd. P. Allis & Co., of Milwaukee, have the contract and will superintend the change.

The wheat crop of Illinois this year is prodigious, and, take it all in all, is not only the largest, but the best in quality ever grown in the State. The total yield is put down at 56,508,309 bushels, of which 53,865,505 are winter wheat and 2,642,804 spring wheat.

The Reliance Mills of C. Manegold & Son, Milwaukee, is about ready to start. This has been changed over to an entire roller mill. Ewd. P. Allis & Co., of Milwaukee, furnishing all the machinery and superintendence. The mill will have about 800 bbl. daily capacity.

E. V. White & Co., of Standard Mills, Minneapolis, have ordered 11 more of the Gray Patent corrugated rolls, and 4 Wegmann Patent Porcelain roller mills. This is in addition to the large order given some months ago. Ewd. P. Allis & Co., Milwaukee, are doing the work.

Becker & Underwood of Dixon, Ill., are rebuilding their mill. It will be a full roller mill of 500 bbl. daily capacity. The rolls used will be the Gray Patent corrugated rolls and Wegmann's Pat. Porcelain rolls, all ordered from Ewd. P. Allis & Co., Milwaukee, who have the contract for the entire mill.

The old mill, properly known as Sunderland's mill was almost entirely consumed by fire, Sept. 21. The flames broke out in the second story of the building, and are supposed to have been the work of an incendiary. It was occupied and operated by Asdelmier & Dupries, and owned by Henry Squires. The building was valued at \$15,000; machinery \$5,000; stock, about \$2,000; insured for \$9,000.

O. E. Brown, Grand Rapids, Mich.; Gardner, Campbell & Co., Irony, Mich.; Geo. N. Patter, Pattersville, Mich.; John F. Graff, Grand Rapids, Mich.; Mazeppa Mill Co., Mazeppa, Minn.; Z. G. & R. Simonds, Kenosha, Wis.; E. Middleton & Son, Greenville, Mich.; J. B. Kehl, Chippewa Falls, Wis.; Johnson & Jarver, Des Moines, Ia. The above parties are putting in the Gray Patent roller mills bought of Ewd. P. Allis & Co., Milwaukee, Wis.

### Circumstantial Evidence.

United States Senator Voorhees tells the following interesting story of a remarkable trial: I remember once defending, at Crawfordsville, Ind., a man named Owen, indicted for the murder of his wife by poison. It was twenty-odd years ago. Owen was a respectable farmer

in good circumstances, and a consistent church member. He had been twice married. He had several children by his first wife; his second was childless, a circumstance which peculiarly affected her mind and temper. She would not permit his children to reside with her, and compelled him to find a home for them elsewhere. She had frequently threatened suicide in consequence of these troubles.

One night Owen was awakened from sleep to find her dying. He called in assistance and sent for a physician, but she was dead before any one arrived. Her sudden demise excited suspicion and three days after her burial this was communicated to him by a friend, who further informed him that arrangements had been made to disinter the body and investigate it.

Owen was greatly agitated at this intelligence, and, after a short pause, replied: "If this is done, and poison is found in Kezia's stomach (his deceased wife's Christian name), I will be accused of her murder, convicted and hanged. But I am as innocent of it as that tree," pointing to one near by.

That night he transferred all his property to a son, disguised himself, and fled the country. The body of his wife was exhumed and an autopsy had. Enough strychnine was found in her stomach to kill a mule. There was a universal expression of horror at the discovery, and a large reward was offered for the arrest of the fugitive. After some months he was found in Canada, where he was living under an assumed name. He was brought to Crawfordsville in irons, and it was with difficulty that his execution by a mob could be prevented.

Joe McDonald (now my colleague in the Senate), Jim Wilson, once a representative in Congress and subsequently minister to Venezuela, and myself defended him. There was a formidable prosecution, Lew Wallace, Judge Gregory, and others appearing against him.

It was proven that a short time before Mrs. Owen's death her husband had purchased strychnine at a drug-store in the neighborhood, telling the druggist that he wanted it for poisoning rats. But he asked that it should be charged to him, a fact upon which we laid great stress in argument, insisting that had he entertained a criminal design in buying the drug he would not have put the evidence of the fact upon record. A daughter who was visiting her father's house when the poison was brought home, testified that he handed it to her stepmother in her presence, cautioning her to be careful with it. A brother of his wife, who was greatly embittered against him, and was a witness for the State, admitted upon cross-examination that Owen's treatment of his sister was invariably considerate and kind.

This was all we had to base a defense on. The odds were fearful. There was the remark of the marked agitation of Owen first informed of the suspicions existing against him, his admission that if the post-mortem examination showed that poison was the cause of his wife's death, he would be accused of administering it and hanged; his purchase of the poison; his transfer of his property and his flight, all combined, nearly irresistibly led to the conviction of his guilt. "Mr. Voorhees," he said to me, "however darkly things may appear against me, I am not guilty;" and I believed him. We fought the case like tigers upon the reasonable doubt which he deemed the evidence had not excluded, and won it.

Such an uproar as followed I never witnessed. Owen was taken to Wilson's private residence, pursued by a crowd crazed with disappointment and thirsting for his blood. Wilson, McDonald and I stood at the front gate with pistols in our hands, and checked the approach of the mob until Owen could escape from the rear of the house in a conveyance that had been provided for him. It is the only time in my life I ever saw McDonald with a pistol. He showed unmistakable purpose to use it if necessary.

Owen went to Texas and died there, I presume, as I have never seen nor heard of him since. His wife had committed suicide. He knew it, but preferred to keep the fact to himself to avoid scandal and exposing her. He was a weak, but an honest man. For his safe deliverance he was indebted to a capital jury, men who could be neither bought nor scared. The foreman had served the country in the state senate, others had held office, and all were persons of consideration and influence.

We will send a copy of the MILLERS' TEXT BOOK, by J. McLEAN, of Glasgow, Scotland, and the UNITED STATES MILLER, for one year, to any address in the United States or Canada, for \$1.25. Price of Text Book alone, 60 cents. Send cash or stamps.



## The Wheat Situation.

A well-known New York correspondent of the *Chicago Times*, in a letter bearing date Sept. 28th, writes as follows on the above subject:

According to the table contained in my letter of the 18th inst., wherein the presumed surpluses and requirements of the various wheat countries were set forth in detail, two-thirds of the total surplus of all exporting countries, amounting to 800,000,000 bu., is lodged in the United States, while of the total requirements of all importing countries, amounting to 200,000,000 bu., those of the United Kingdom constitute over one-half. Under this distribution of surplus and division of wants, those who are at all conversant with the trade will readily understand that the question of price during the autumn and winter months is mainly to be settled by American farmers and the British trade. Relatively speaking, the influence and operations of all other exporting and importing countries are likely to prove mere "side-shows." And the fact that there will probably be 100,000,000 bu. from the 1880 crop in excess of all bread and seed requirements up to next harvest time, cannot fail to exercise a continuously depressing influence upon the markets, and furnish the British with a powerful leverage in the adjustment of prices. Let us examine the situation a little more in detail for one moment, that Western farmers may be the better able to understand with what they have to contend.

At the opening of the campaign on the 1st of September the European granaries were, as we all know, substantially bare of native wheat, although at most British and continental outposts very fair stocks of foreign were held, and especially in the western and northern parts of France. Since then the imports into western Europe generally have been very large, and stocks of foreign have further largely accumulated. For example, the imports into the United Kingdom for the four weeks ending the 15th of September, were at the rate of 23,000,000 qrs. per annum, while those into France, Belgium, etc., were on a proportionately liberal scale.

As is now generally conceded, the European harvest, taken as a whole, may be set down as a fair average in quantity, but of exceptionally heavy weight per bushel, and superior bread-producing qualities. In this respect the wheat crop of England and France are remarkably conspicuous, and especially so when contrasted with the miserable quality of last year's greatly deficient crops.

The area under wheat in Great Britain (including Ireland) and France was a trifle larger this year than last, and in the former was about 3,000,000 acres in each year. An average acreable yield in Great Britain and Ireland is 30 bu., which, on the above area, would give a crop of 11,250,000 qrs. Their farmers' deliveries for the cereal year ending the 31st of August, 1880, were, in round numbers, 5,600,000 qrs., and allowing 2½ bu. per acre, or 850,000 qrs. for seeding, the 1880 crop would indicate that the 1879 crop yielded but 6,450,000 qrs., or 43 per cent. less than an average in quantity; but the quality of the grain was generally very poor, much of it weighing only 58 lbs. to the bu., and not a little of the crop was entirely unfit for milling purposes. It would be going very safe to estimate the flouring qualities of the 1879 crop at 25 per cent. below an average, or, in other words, that the 5,600,000 qrs. delivered from it were not equal to over 4,200,000 qrs. of good, sound wheat, of usual average weight and bread-making qualities. Per contra: The 1880 crop is a full average (some good judges say above an average), while most of the grain is of superior weight and bread-producing qualities. But calling the crop an average, both in quality and quantity, the total would be 11,250,000 qrs. Taking out 850,000 qrs. for seeding the 1881 crop, would leave 10,400,000 for delivery, and practically (for bread-making) 6,200,000 qrs. more wheat than last year's crop. Thus, for human food purposes, the British wheat crop of 1880 may be said to exceed that of 1879 by 50,000,000 bu.

The net receipts of wheat and flour into the United Kingdom for the cereal year ending the 31st of August, 1880, were equivalent, in round numbers, to 16,500,000 qrs. of grain. Assuming that the deliveries of home-grown during the same period, amounting to 5,600,000 qrs., were equal to only 4,200,000 of average good quality as previously stated, the total of home and foreign supply was only 20,700,000 qrs., whereas the consumption may fairly be stated at 28,000,000; hence, importers, millers, dealers and bakers must, together, have trenched upon reserved stocks during the

year to the extent of 2,300,000 qrs., and it was this falling back upon reserves during the winter that was mainly instrumental in breaking the neck of the "great American wheat syndicate," and of restoring to a sounder but less happy frame of mind, the \$2-per-bushel lunatics generally.

Assuming that farmers in the United Kingdom carry over no more wheat next harvest time than at the last, the foregoing figures imply that an import of 12,600,000 qrs. this cereal year would leave the Kingdom with as much stock at the end of the year as at the beginning, thus: Reserves drawn upon last year, 2,300,000 qrs.; plus net import, 16,500,000; minus increase of crop, 1880 over 1879, equal to 6,200,000, gives 12,600,000 qrs. required in port for 1880-81. Presumably, the import will considerably exceed this quantity, but it is considered a matter of vital importance to understand the British situation this season, as it certainly was last, and its possibilities.

Turning to France, where an average yield of wheat on her present area is about 285,000,000 bu. against 90,000,000 in the British Isles, we find nearly an average acreable yield of very superior average quality, the extra weight of the grain over that of ordinary years being computed as equal to about 10,000,000 bu. thus bringing the crop close up to an average outturn, and probably equivalent to 45,000,000 to 50,000,000 bushels better than last year. As an importer France is not likely to cut much of a figure this campaign, and as there requirements of Belgium, Holland and Germany will be moderate in the aggregate, while it is now admitted that Italy and Austro-Hungary will have a surplus for exportation, it will easily be seen that the key to the import situation is England, and, as stated at the outset, it is with her millers and importers that our farmers will have to contend for supremacy in control of prices.

At this moment the market is strong at some little recovery, but it is to be borne in mind that the California crop, like that of the Northwestern States, has yet scarcely begun to move; notwithstanding its great magnitude, only 24 cargoes, consisting of 775,000 centals having been got off from July 1 to Sept. 14, against 52 cargoes of about 2,000,000 centals for the corresponding period last year. The delay this season arises from a combination of influences, such as the lateness of the harvest, the greater requirements of labor for threshing and housing their huge crop before the rainy season sets in, the inadequate supply of tonnage and high freights, with declining markets and resulting indisposition on the part of farmers to sell, etc. But there is a large fleet now headed for San Francisco, and a large exportation during the next few months looks highly probable.

Similarly a late harvest, wet weather, fall plowing, and an indisposition to sell, have greatly delayed the Northwestern movement, but from that quarter, as well as from the winter wheat States and the Pacific coast, there is every indication that the aggregate movement is speedily to assume much larger proportions.

From the sixth annual report of the board of trade of Portland, I notice that Oregon exported for the harvest year ended the 1st of August, 177,790 tons of wheat, flour reduced to its equivalent in wheat included, and that the exportable surplus this year is estimated at 266,000 tons, or about 8,800,000 bu. As late as the 16th inst. no wheat had been exported.

Thus, for the time being, everything favors a general bracing up of the market, and perhaps some little further improvement of prices, and if farmers are wise they will avail of this better state of things to market their grain freely during the remaining period of navigation and comparatively low freight rates, for adding to your present prices a 40c rail rate, Chicago to New York, and 6 shillings ½ quarter

thence to Cork for orders, gives a price of some 5 shillings ¾ quarter above present English quotations.

Large quantities of fall wheat are being sown in Perth county, Ontario. The farmers are so intent on sowing fall grain that they cannot take time to visit the market towns. The result is that grain has not yet arrived in very great quantities.

This country is landing Indian corn in Europe at a cent a pound, or a half-penny sterling. We are actually shipping corn to Hamburg and Italy to still, it is so cheap. At least twenty cargoes have been sent lately to Hamburg and Bremen distilleries.

The stock of lard in New York is reported at about 15,000 tierces.

Cranberry picking in Camden, N. J., and vicinity, is now being vigorously prosecuted.

The number of hogs slaughtered at Cleveland since March 1 is 176,854, nearly three times the number which have been slaughtered in Cincinnati in the same time, the number in the latter city 60,500.

Lower grades of butter for shipping have not been so scarce in Philadelphia since the war, and there is nothing in the market under 12@16c that deserves the name. The reason for this condition of affairs is that butter is bought up for exportation.

It is announced that the treasury department at Washington have rescinded the exemption from the tonnage tax at American ports hitherto enjoyed by Canadian-built lake vessels owned by citizens of the United States.

**BURDETTE'S NARROW ESCAPES.**—"Sometimes, when I look over my life," says Burdette, editor of the *Burlington Hawkeye*, "I am amazed to see how the pages of its record are dotted with hair-breath escapes. I escaped the dangers and hardships of the revolutionary war by waiting until the cruel war had been over nearly thirty-six years when I got born. When the Brooklyn Theater burned I was in Burlington. When the yellow fever broke out in New Orleans I was in Minnesota, and immediately skipped out to Canada. When I was a boy at school, one day all the boys in the school were flogged all around for robbing an apple orchard, and the flogging didn't do a bit of good, for every beggar of them had the cholera morbus all that night, just the same. And I? I was attending another school twenty-three miles distant. When all of my sisters and brothers were down with the scarlet fever, I was down South in the army, and when I read the letters from home I laughed aloud to think of my great good fortune and that I would only have to be shot at once or twice a week instead of having to take medicine three times a day. When a man comes to the office with a little bill, nine cases out of ten I am out. And if, by some astonishing blunder I am in, then, indeed, I am more unfortunate, but the man is in no better luck than before."

Foreign newspapers report great damage to crops in South Russia by insect pests, particularly locusts. In the district of Rassachs, an area of over 400 kilometres has been devastated. Upward of 5,000 men were engaged daily in the work of extirpation; trains were delayed much as they are in this country during bad grasshopper years. In the Odessa district fourteen companies of soldiers were employed to fight them. The specie is larger than our Western "spretus," but probably not more destructive.

THERE is a lake on the Saw Tooth mountains, in California, that has probably no equal in the United States. It is about sixty or sixty-five miles from Bonanza, and at an altitude of nearly twelve thousand feet. The lake lies in a basin among the sharp crags of the snowy Saw Tooth, and is a sheet of perpetual ice. It was discovered in August of last year

by a party of prospectors, and named the ice lake. The sun seemed to have no effect upon it except in places adjoining the shore. It is simply a great bowl in the hard mountain rock brimful of solid ice, upon which the rays of the sun descend with no power to penetrate.

Guido Hansen & Co. will build a malt and hop house on the southeast corner of Juneau and Jefferson streets, in Milwaukee, which, with machinery and other outfit will cost from \$35,000 to \$40,000. The corner building, which will be 36 by 60 feet and 3 stories high, is to be used for the sale and storage of hops. This and other buildings of the plant will cover an area of 100 by 120 feet. The barley elevator will be 36 by 60 feet, and the kiln 40 by 46 feet. The malt house will be one of six floors and the capacity of the establishment is to be 50,000 bushels, not including the hop stowage. This establishment will be arranged on the most approved plan and will be furnished with the best of machinery.

We note that the large Merchant mill of Messrs. Commins & Allen of Akron, Ohio have displaced all the Purifiers they had in their mill and put in their places the Case purifier, made by the Case Purifying Co., Columbus, Ohio, putting in the double machine which is said to give twice the capacity in the space of one ordinary machine. It is said this change is highly satisfactory to the milling firm. It is also worthy of note that the large 20-run mill of Jones, Ballard & Ballard of Louisville, Ky., have just put in two Case purifiers. They are the double machines.

An improved method of stopping engines, says the *Electrician*, has been devised by Mr. James Tate. The main object of the device is to enable any child or unskilled person in any part of a mill to stop the engine in case of an accident. The action is exceedingly simple. By touching a spring similar to the spring of an electric bell, an electric ball is set in motion, and the ball drops and shuts off the valves, which prevents the steam from escaping, and the engine is brought to a standstill.

## Points in Etiquette.

Say "good-by," not "good morning."

Upon leaving a room, one bow should include all.

Upon introduction, enter at once into conversation.

Never wait over fifteen minutes for a tardy guest.

A note requires as prompt an answer as a spoken question.

Regrets in reply to invitations should contain a reason therefor.

At a table you are required to thank the one who waits on you.

Strangers arriving should notify friends by card or by their presence.

You should exchange calls with individuals before you invite them to your house.

Only letters to unmarried ladies and widows are addressed with their baptismal name.

To return a personal call with cards enclosed in an envelope signifies that visiting between the persons is ended.

Unless there is great difference in age, a lady visiting should not rise either on arrival or departure of other ladies.

**FOR SALE**—A Morgan Smutter, 45 bushels an hour. A Becker No. 5 Brush. Both almost new. Enquire at NORTHWESTERN MILLS, 513 Canal St., Milwaukee, Wis.

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MILWAUKEE, OCTOBER, 1880.

THE Pennsylvania Millers Association will meet at Wilkesbarre, Pa., October 12.

THE Stevens roller system is being rapidly introduced into Milwaukee flouring mills.

STARCH manufacturers in need of a competent foreman will consult our "Situation" column.

THE Cockle Separator Mfg. Co., manufacturers of the only cockle separator in the United States, report a very active trade.

THE River Street Flour Mills in Milwaukee have just changed ownership, and we are informed extensive improvements will be made at once.

HAVE you read Al. Hoppin's latest novellette entitled "The Noble Miller?" If not, read it. Vine Street romances cannot "hold a candle to it."

With the November number the UNITED STATES MILLER will commence its tenth volume. Send in your subscriptions now. Subscription price \$1 per year.

SEVERAL firms in Minneapolis have withdrawn from the Minneapolis Millers' Association, and the effect has been to advance the price of wheat in that city.

WE are glad to note that many of our exchanges are "going for" the bucket shops. They are nothing more or less than gambling dens and they should be stepped as much as any other gambling institution.

THE American Miller says that a Chicago man has invented a machine that will compress bran to about one-tenth of its usual bulk. We shall undoubtedly soon have full particulars of such a valuable invention.

OUR readers in need of belting and lace leather will serve their own interest by reading the advertisement of O. L. Packard, in this issue. The Schultz patent leather belting is highly commended by those who have used it.

HON. GEORGE HARDING, of Philadelphia, the eminent patent lawyer, is going to build a hotel in the Catskill Mountains. Harding is unquestionably a first-class patent lawyer but it will take time to prove that he can keep a hotel.

We respectfully request our readers when they write to persons or firms advertising in this paper, to mention that their advertisement was seen in the UNITED STATES MILLER. You will thereby oblige not only this paper, but the advertisers.

MESSRS. HOWES, BABCOCK & EWELL will, after October 1st, be the name of the firm now so prominently and favorably known as Messrs. Howes, Babcock & Co., of Silver Creek, N. Y. The business will continue on, the same as in the past.

We will send a copy of the MILLERS' TEXT BOOK, by J. McLEAN, of Glasgow, Scotland, and the UNITED STATES MILLER, for one year, to any address in the United States or Canada, for \$1.25. Price of Text Book alone, 60 cents. Send cash or stamps.

READ Teter & Allen's new advertisement. Their hand tool for dressing millstones is meeting with a large sale and gives general satisfaction. Teter & Allen's middlings purifier is also meeting with ready sale. The firm reports business first rate.

WE acknowledge the receipt of a copy of the Transactions of Department of Agriculture of Illinois, for 1879, Vol. 17, from Hon. S. D. Fisher, Secretary of the State Board of Agriculture. It is a volume of nearly 700 pages of interesting matter and valuable statistics.

NEW ORLEANS is rapidly becoming a grain receiving and shipping port. In one day recently five tugs arrived with barges averaging 180,000 bushels to each tug, or 396 car loads of grain. The South has escaped the ravages of the yellow fever this year and business generally is prosperous.

SEPTEMBER 21, Albert Hoppin, Esq., editor and proprietor of the *Northwestern Miller*, of Minneapolis, Minn., favored us with a friendly call. We were gratified to see him looking so well and feeling in excellent spirits, and are also pleased to know that there is an attraction in the city for him outside of business matters.

THE millers and milling machinery men being generally satisfied with the Millers' International Exhibition, lately held in Cincinnati, it is probable that another similar Exhibition will be held in 1882. We would suggest that Milwaukee be the city and the new exhibition building now being erected be the place for it.

New England farmers are turning attention to wheat culture. For some years wheat has been considered one of the crops that New England agriculture had outgrown; but of late, notwithstanding that lands there are much more broken than at the West, it appears, from the experience of the past six years as large crops can be raised in each of the New England states as can be or is grown at the West, and it is probable that quite a revival of the wheat industry will be witnessed there another year.

## Unsigned Diplomas.

The following letter from Geo. E. Gault, President of the recent Millers Exhibition, is self-explanatory.

CINCINNATI, Sept. 25, 1880.

Editor United States Miller:

Will you please make mention of the fact that through the carelessness of the person sending out the diplomas of the Millers International Exhibition, a number of them were mailed before being signed by me. In all cases where parties have received these unsigned diplomas if they will return them I will take pleasure in rectifying the mistake. Yours truly,

GEO. E. GAULT.

MILWAUKEE FLOURING MILLS.—Most of the flouring mills in Milwaukee have recently been or are now being greatly changed. Millstones are generally being taken out and roller mills take their places. The advantage gained by the change are generally considered great by the mill owners. The milling capacity of Milwaukee flouring mills is greater now than at any previous time, and the business is in a prosperous condition. The mill furnishers and millwrights of the city are as busy as bees and do not regret the great changes being made. The stone dressers, however, are down on the change and predict a general return to the use of millstones before long.

THE Chief of the Bureau of Statistics furnishes the following information in regard to immigration: There arrived in the customs districts of Baltimore, Boston, Detroit, Huron, Key West, Minnesota, New Bedford, New Orleans, New York, Passamaquoddy, Philadelphia and San Francisco, during the month ended August 31, 1880, 58,972 passengers, of whom 50,508 were immigrants, 5,974 citizens of the United States returned from abroad, and 2,490 aliens not intending to reside in the United States. Of this total number of immigrants arrived there were from England, 6,239; Scotland, 1,737; Ireland, 6,157; Germany, 11,918; Austria, 1,235; Sweden, 3,003; Norway, 1,677; Denmark, 492; France, 412; Switzerland, 650; Spain, 49; Portugal, 49; Holland, 28; Belgium, 151; Italy, 624; Russia, 576; Poland, 204; Finland, 37; Hungary, 487; Dominion of Canada, 13,506; China, 396; Cuba, 111; Wales, 77; all other, 436.

A BATTERY gun was tested in New Haven, recently, that fired 12,828 shots in one minute. It was invented by Myron Coloney, and Dr. J. H. McLean, of St. Louis, furnished the \$15,000 that was necessary to make the weapon. Coloney was formerly commercial editor of the *St. Louis Democrat*, and gave the first information which broke up the whisky ring of that city. He has since been in government employ. His head has always been full of crotchets, none of which have amounted to anything. One of them was the barge system of shipping grain to England by way of the Mississippi and New Orleans, for which the St. Louis Merchants' Exchange gave him a gold watch. It is said, however, of his new gun, that though the workmanship is rather intricate, those who attended the public exhibition seemed convinced that the weapon could do all that is claimed for it. Thirteen thousand shots a minute is, however, a good many.

## How to Make Good Flour.

BY W. H. SYNDER.

To make good flour, with absolute certainty, it is necessary that none but good, sound wheat be used, and that it be thoroughly cleaned. The process to be employed should be one of gradual reduction, and, while many devices to accomplish this may be used, perhaps nothing better than the burr stone, of the proper texture and temper, can be found. They certainly will do the chopping rapidly and well, but, whatever may be employed for this purpose, care is necessary to see that the product is even and regular, and that it be accomplished without heat or unnecessary friction. Friction causes heat, and this is fatal in any shape to the production of good flour.

After the wheat has been reduced to a suitable degree of fineness, the white product must be separated from the dark stuff, and this can be accomplished only by bolting; and of bolting, I think we can hardly do too much. In the process of bolting, when any portion is found to be pure, and of the right degree of fineness, it may be sent to the packer without further treatment, or it may be brushed, as brushing will benefit the flour in any stage. As rapidly as separations are made they should be kept apart and distinct, one from the other. That is, when any dark stuff is taken out, it should not be again allowed to mingle with the white portion, whether it be flour or middlings. The dark stuff should be thrown off at each reel, and the flour and white material carried on for further treatment. The middlings should be graded, and purified, and then be reduced again and again as long as any portion remains unfinished, but with extreme care. No forcing or overfeeding should be practiced, no matter what method of reduction is employed, as it is injurious in any of the steps of reduction, and especially so in the reduction of middlings, as they are tender and must be carefully handled.

The product of each reduction must be stripped of its flour, in bolts with air drawn through the reels, at the tail end, as this will aid the purification, and prevent the fluff and red-dog from passing through the silks; specially should air be used in all reels treating middlings and such material as returns. All the white material should be brushed, specially all the fine separations; and such material as strip flour, returns and fine middlings should be brought to a suitable finish by a brush machine, as there is less danger of injuring the flour by reducing this class of material with a brush, than by any other device. When it is borne in mind that the white material must be reduced gradually, gently, and without heat or friction, it will be seen that brushing is much the safest way, and besides it gives the flour that delicate white look we so much admire, making it feel to the touch like velvet. Flour made from purified middlings is very choice, without being brushed; but it will improve it very much to brush it and bolt again. A large per cent of the flour from the wheat may be made into a high grade by this system of gradual reduction, using air in bolting, and finishing with brushes. Middlings are tender, and it is surprising to note the effect of brushing this class of material.

The coarse, purified middlings may be reduced by the burr stone or by rollers, avoiding too much pressure. One great difficulty with millers is this habit of feeding the middlings stone too fast. No burr stone should be crowded when reducing middlings. Never go beyond a point in which the material, after being operated upon, is not left in a dry, cool, lively state.

There is, probably, no better way of treating tailings from purifiers, than by smooth rolls, and nothing better for regrinding bran than the burr stone. While there are many ways, in which like results in milling may be accomplished, and while hardly any two American millers agree upon or adopt like methods throughout, one thing may be called settled, and that is, that gradual reduction is the only sure and certain method by which a choice and reliable flour can be produced. The same wheat, which, in the hands of one miller will produce a flour of surpassing excellence, may, in the hands of another, be utterly ruined in the process of manufacture. To accomplish the best results requires the aid of a large amount of machinery, but in a large majority of the mills throughout the country great improvements may be made at a small outlay.—*The Milling World*.

## Kerosene and Sunshine as Motors.

The East Greenwich (R. I.) correspondence of the *Providence Journal* contains the fol-

lowing: "For a fortnight past a small yacht, not more than 20 feet in length, has been gliding over the waters of our bay which has excited no little amount of curiosity, while it is regarded by many as a wonder. It makes at least 12 miles an hour, but no smoke-pipe or escaping steam indicates the nature of the power that propels it. A lighted match applied will set it in complete motion in one minute, and the expenses of this novel motor do not exceed 6 cents an hour, kerosene being the only combustible used. The machine bears a close resemblance to the steam engine, having for its main features a cylinder, piston, crank and fly-wheel. There is also an air-pump for compressing air and a chamber for holding safely under considerable pressure. The air is admitted to the working cylinder by means of suitable valves, and it is made to pass in its way to the cylinder through fibrous material, moistened with petroleum, so that the oil is vaporized and mixed with the air, thus forming a combustible compound, a small jet of which is kept constantly ignited to the cylinder. The petroleum is fed to the fibrous material which is closely packed in a small recess, a few drops at each revolution of the engine, by means of a small injecting-pump worked by the engine. After the air-chamber has been once charged, the pressure is constantly maintained, and the opening of a valve and the application of a lighted match is all that is necessary to start the engine, which can be done in a few seconds. The parts that might become heated are kept cool by a water circulation, so there is no possible chance of explosion. The refuse of combustion is conducted down through the bottom of the vessel into the water, thus avoiding the necessity of a smoke-stack. It also avoids the heat which is generated by a huge boiler, and can be easily run by an ordinary person. The inventor of this motor, who has devoted many years to developing and perfecting it, is Mr. Geo. B. Brayton, a Greenwich-bred boy, descending on the Waterman side from the good old Baily stock, so well known in the westerly part of the town."

Paris correspondent: An invention has just been perfected which will really prove of incalculable benefit to the Gulf States, for it puts into the possession of every citizen ten niggers who will work, won't eat, won't want clothes or wages, and this concentrated ten niggers requires no skillful hand to work it. It will lift 114 cubic feet of water fifteen feet high every hour; it will drive a mill, a threshing machine, sugar cane crushing rollers, a churn, a straw cutter, it will clean rice, gin cotton, boil water, cook, distil water, turn ice cream freezer, make ice, distil ardent spirits, wash, in fine, be worth more than any ten niggers, or any ten Chinese, or any ten Spaniards.

Do you remember that visitors to the great exhibition, in 1878, were astonished to see a pump lift water, steam puff hissing, and boil soap without coal or fire, only by sunbeams? Mons. Mouchot's "Solar Receiver," which did all these wonders, has been so improved that it really seems to have become of practical use. Mons. Mouchot's apparatus consisted of a brass shade, like a lamp shade, plated with silver, with its largest opening turned toward the sun. In the center of the shade and in its axis was the receiver to be heated. This receiver was coated with black paint, or lamp black (black is a great absorber of heat), and all around it a black screen to prevent the escape of the imprisoned heat. Mons. Pifre has changed somewhat Mons. Mouchot's apparatus. The latter gave the sides of his reflector an inclination of 45 degrees. The former gives them something of the parabolic shape, makes the boiler less high by half, and so shuns all loss by radiation; he throws the sunbeams on the lower part of the boiler, which arrangement secures the regular production of steam; he changes the mechanism, which keeps the apparatus constantly exposed to the sun; he has invented a new motive power and means of transmitting motion. To get up a machine of one-horse power requires a boiler which produces 42 pounds of steam with a heat of five atmospheres; this quantity of steam can be raised with a reflector of 20 square yards, say 15 yards 18 inches diameter at its greatest base.

The ship, "Eric the Red," was totally wrecked on the 4th inst. on the southwest coast of Australia. Her cargo, in part, consisted of many American exhibits intended for the World's Exhibition in Australia, which opens at Melbourne October 1. Of course it is too late to replace them. The exhibits were largely the products of Eastern manufacturers, and their loss is, indeed, a very untimely occurrence.



### The Eureka Automatic Magnetic Separator.

With the coming into use of the wire binder it was found to be necessary to have some machine that would take out the broken pieces of wire which it was impossible to remove by the use of the ordinary separator. The peculiar nature of the magnet was fortunately thought of, and various forms of magnetic separators for use in flouring mills have been devised.

The common horse shoe magnet, arranged in gangs and placed in the spouts through which the grain flowed, was used. The use of these magnets revealed the fact that a large amount of other metallic material, aside from the wire used in binding, such as small bolts, nails, tacks, pieces of sheet-iron and particles of ore were found mixed with the grain, which could not be removed without the aid of some sort of magnetic arrangement.

The gang magnets were found to be defective, as it was found necessary to remove them from the spouts at stated times and brush off, by hand, the metallic material that had been attracted to the magnets. While this was being done it was also necessary to stop the flow of grain, otherwise the metallic material would pass on with. To obviate these difficulties is the design of this machine.

The cut here shown illustrates the above named machine, which does this work effectually as well automatically, and its operation is as follows:

The grain is fed into the hopper from which it passes over a zinc plate the entire width of the machine. As this zinc plate is placed on poles of magnets, any metallic substance in passing with the grain over the magnets, is arrested and held until removed by the wiper, which, being attached to an endless belt, passes once a minute over the magnetic field and carries of all metallic substances, and deposits them in a box at the side of the machine. This process relieves the miller from care and renders it absolutely certain that no metallic substance can go with the grain to the burrs or rolls, as the case may be, unless intermixed after it has passed the machine, and to prevent this it should be placed as near the burrs or rolls as possible.

The experience of those using the ordinary magnets has shown that no miller, although he may not grind grain harvested by reapers having the wire-binding attachment, can afford to be without something for removing this material, and especially is this the case when rolls are used, to say nothing of the immense damage done to bolting cloths were no such precaution is taken. This machine will, no doubt, pay for itself many times each year, even in a mill of small capacity.

Messrs. Howe, Babcock & Co., of Silver Creek, N. Y., are the manufacturers of this useful machine, and the fact that this well-known firm has undertaken its manufacture is a guaranty that it is a work of merit. They manufacture their own magnets for use in the machine. There are five sizes built with capacities varying from 80 to 300 bushels per hour so as to be adapted to the use of either large or small mills. We predict for this machine a great sale.

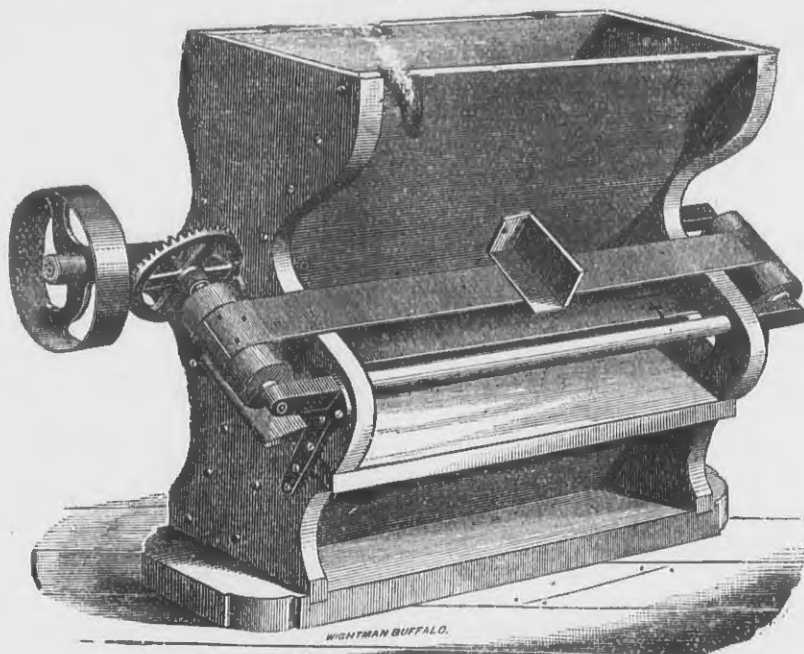
**SMELTING IRON SAND.**—It seems, says the *London Times*, that the New Zealand iron sand, as taken from the beach, is mixed with an equal quantity of clay and of the ordinary

first and only trial, 500 weight of steel in the manner described above, and his success seems likely to lead to further and more extensive efforts to utilize the almost inexhaustible deposits of this ore which exist at Taranaki and elsewhere.

### The Childress Mill-Stone Balance.

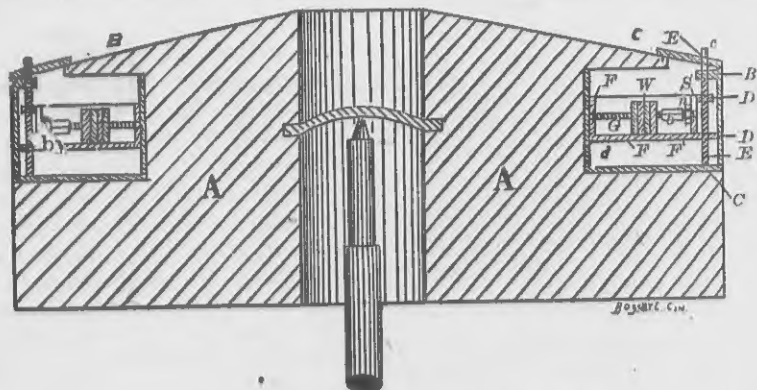
This invention relates to improvements in balancing mill-stones. The object of the invention is to so balance the stone that in running its grinding surface will be at all times parallel to that of the bed-stone, and thus grind evenly and smoothly. The nature of the invention is as follows:

In the above cut, the letter "A" designates



THE EUREKA AUTOMATIC MAGNETIC SEPARATOR.

the moving stone, mounted by its rynd upon the spindle. "B" and "C" represent pockets of rectangular shape, formed in the top of the stone, diametrically opposite each other, and fitted with a cast-iron box, "d." "E" indicates a vertical screw-shaft, having its bearings in a lug "B," projecting from said box horizontally, and in a step "C," at the bottom thereof, and provided at its upper end with a wrench-seat, "c." This shaft turns freely in its bearings, and engages with its threaded portion, two threaded lugs "D," upon the end of a metallic box "F," arranged in box "d." By operating the shaft "E," the box "F" may be raised or lowered at pleasure. "G" indicates a horizontal screw-shaft having its bearings in the end of box "F," and having applied thereon a weight or weights "W." This shaft is inserted in a perforation at one end of the box "F," and its other end is dropped into a slot "S," formed in the other. It turns freely in its bearings, but may be locked against rotation when desired by a jam-not "n," which is set up against the end of the box by means of a suitable tool. The weights are preferably square, and rest on the bottom of the box "F," so that they cannot turn when the shaft "G" is rotated. This is readily accomplished by means of a wrench applied to a seat "b," and causes the weight or weights to be moved to or from the centre of the stone, thus attaining a perfectly accurate standing balance. The running balance is obtained with equal nicety by turning the screw-shaft "E," and raising or lowering the box "F," which contains the weights, or raising one of the boxes and lowering the other.



THE CHILDRESS MILL-STONE BALANCE.

sea-sand, which contains a large admixture of shell; these materials are worked up into bricks, which are hardened in a kiln, broken up into regular pieces, and smelted in an ordinary copula furnace. The product of this simple process is cast steel of the finest possible texture, from which some beautiful specimens of the finest cutlery have been manufactured. These experiments were conducted by a mechanic in the government employ, who was restricted to an expenditure of \$100, and was therefore only able to erect a furnace of the most temporary description; he, however, succeeded in producing, at the

Then should the excess of weight on one side of the stone, be below the meridian line thereof, or above the said line, by adjusting the box vertically, this defect is counteracted, and its injurious effects prevented.

Mr. Trimble, of the firm of Morris & Trimble, of Baltimore, over fifty years engaged in making mill-stones, says it is a most excellent device.

Mr. McGrew, of Jackson Co., W. Va., a mill-wright and miller, said it was the great want of millers, as not one in a thousand could balance his burrs.

Mr. Thos. Bradford, of T. B. & Co., the

oldest house in Cincinnati, was so much interested that he advised the immediate preparation of a circular, and said he, "a miller will, on seeing this circular, say to me or other manufacturers, 'I want you to have this mode of adjustment put in my burrs.'"

The firms of Nurdyke & Marmon, of Indianapolis; Stout, Mills & Temple, of Dayton, O.; Howes, Babcock & Co., of Chataqua, N. Y., and all the other firms conferred with at the Exposition, including Mr. Geo. E. Gault, President of the Exposition, a most pleasant and genial gentleman, indorsed it fully, as the great want of the millers everywhere.

Application for shop-rights, territory or

through which the spindle projects. This embrace of the ring by the forks constitutes a peculiar coupling for the inner ends of the levers, which, it will be seen, causes the movement of the outer end of the levers in the same direction, or the general movement of the levers upon their pivots to be in reverse direction, the levers having at all times only a limited motion, such as is permitted by the loose connection of the forks.

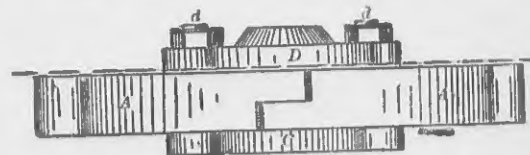
Now in describing the operation of the device, it will be seen, referring to Fig. 2, that when the runner is revolving in the direction of and following the letters *a a'* the faces *a a'* at the extremity of the jointed driver are the points which bear against and actuate the stone. Now if, from any cause, one end of the driver *a'*, for instance, should not bear against the stone, then, if the driver be rigid and inflexible, the runner would simply be driven by the face *a*, and the stone, being actuated upon one side of its center, would be thrown out of balance.

With my arrangement of jointed and flexible driver, it will be seen that, if the driver bears only at *a*, the driver will bend in the center by the swiveling of the forks about the ring *E*, and the opposite lever will be deflected upon its pivot-bolt in the reverse direction, and its outer end *a'*, will be advanced, as shown in dotted lines, so that it will be in bearing contact with the runner, and cause the latter to be driven upon both sides of its center and by both ends of the driver, thus keeping the stone in balance.

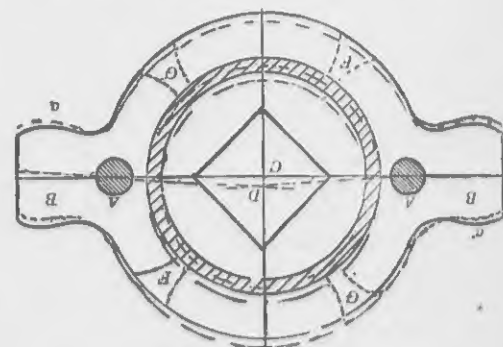
Applications for descriptive circulars, drivers, territory, or royalty, can be made to Col. J. M. McCue, at Afton, Nelson Co. Va.

### A Fountain of Health.

Mr. David Caruthers, of Montana, new in Washington Territory, writes from Spokane Falls concerning the discovery near that place of a lake, the waters of which possesses wonderful healing virtues. He boldly asserts that there is no disease of the skin that two or three baths will not cure, while in nervous troubles, rheumatism, paralysis, and the like ailments, the water has a beneficial effect almost immediately, and in a few weeks makes a new man of the patient. As yet no correct analysis of the water has been made, but almost any one can detect salt and borax in the taste. The lake is nearly round, being a mile and a half long and over a mile wide, and is sheltered on all sides by immense forests of pine and fir. The water is clear, of a dark color, and so buoyant that it will sustain the weight of a man without any exertion whatever. There is no animal life in the lake except a species of jelly-fish. Ordinary trout or other fish die immediately upon being placed in the water. The lake has no visible outlet, and although fed by several small streams it never increases or decreases in size. Almost anything can be cleaned in the lake much better than by the most powerful chemicals. Its wonderful medical properties came to be known some two years ago, through an old paralytic sheep-raiser, who had driven his flock into the lake to give them the benefit of a good bath. A few days after he noticed that a number of



IMPROVED MILL-STONE DRIVER.—Fig. 1.



IMPROVED MILL-STONE DRIVER.—Fig. 2.

In the diagram, the square opening on dotted lines *DC*, is for the mill spindle to pop through, and projecting also through the ring *E*, and thence to the cock-eye of the balance rynd, where it forms the point of suspension for the runner. That portion of the spindle popping through the driver, fits accurately in the plates and causes them (the plates) to rotate rigidly with the spindle. *B, B*, are the levers which constitute the driver, the same being pivoted upon the vertical bolts *A, A*, which secure the bottom and top plates.

The outer extremities of these two levers constitute the bearing points of the driver, and enter recesses in the runner or balance-rynd to impart motion to said runner. The inner ends of these levers are coupled for the compensating movement in a peculiar manner. Each inner end of said levers is formed in the shape of a fork, the branch *F* of one lever upon one side overlapping a corresponding branch *G* of the other lever upon the same side, while upon the opposite side the branch *G* of the first lever is overlapped by the branch *F* of the other lever. These forks are of circular outline, and in the center leave a circular space, in which is arranged a loose ring *E*

his sheep that were afflicted with the scab were greatly improved. Then he began regularly to wash his animals. In a short time they were completely cured, and not only that, he found that his almost useless arm, which he could not prevent from getting wet as he bathed the sheep, was gaining new life and strength. Gratified beyond measure, he gave his whole attention to his arm, and in a very short time it was completely restored. The news of the wonderful cure spread rapidly around the country. Sick people began to arrive and camp on the shores of the lake. All who came were greatly benefited and a large majority entirely cured.—*Helena (Montana) Herald.*



## A Two Run Low Grinding Mill.

Believing that it will interest many millers who contemplate building small mills, we have secured the accompanying cuts and description of a model two-run flour mill from Messrs. E. P. Allis & Co., mill builders, of Milwaukee. The mill as here represented is in actual existence and gives satisfaction to its owner:

The driving power of this mill is a 10 x 30 Reynolds-Corliss engine, making 90 revolutions per minute. The power required to drive the mill is about 25 H. P. though the engine will easily give 10 H. P. more. In running the mill for 10 hours the fuel required will be about

over feed stone, and the ground feed elevated into a feed bin on second floor from which it can be drawn at pleasure. With the addition at any time of another  $\frac{1}{2}$  chest of bolts, a middlings purifier, a set of rolls to grind the middlings, and a set of smooth chilled iron rolls for extracting germs, this can be made a high grinding new process mill. The power provided is amply sufficient. A few more elevators would be required and the change made very easily.

**FAILURE OF THE LIVADIA'S STEEL BOILERS.** Those engineers who hold that steel is not a good material of which to make boilers, will

Mr. D. B. Merrill, of Kalamazoo, called the meeting to order, and Mr. Jacob Barns, of Grand Rapids, was called to the chair.

Mr. Frank Little, of Kalamazoo, acted as secretary.

Mr. F. B. Mills, of Milwaukee, assistant secretary of the national association, was called upon to state the present condition of the Michigan association with the national association.

Mr. Little, former secretary, being called upon briefly sketched the theory and work of the national association up to the time of the Chicago convention in May 1879, when a new

The secretary was empowered to procure former records and funds belonging to association.

It was voted that an assessment of ten dollars per run be laid upon the membership of the association to meet assessments due national association, and that new members be admitted upon the payment of an initiation fee, and an assessment of \$5 per run of stones.

The secretary was instructed to notify all members not present of the action taken at the meeting.

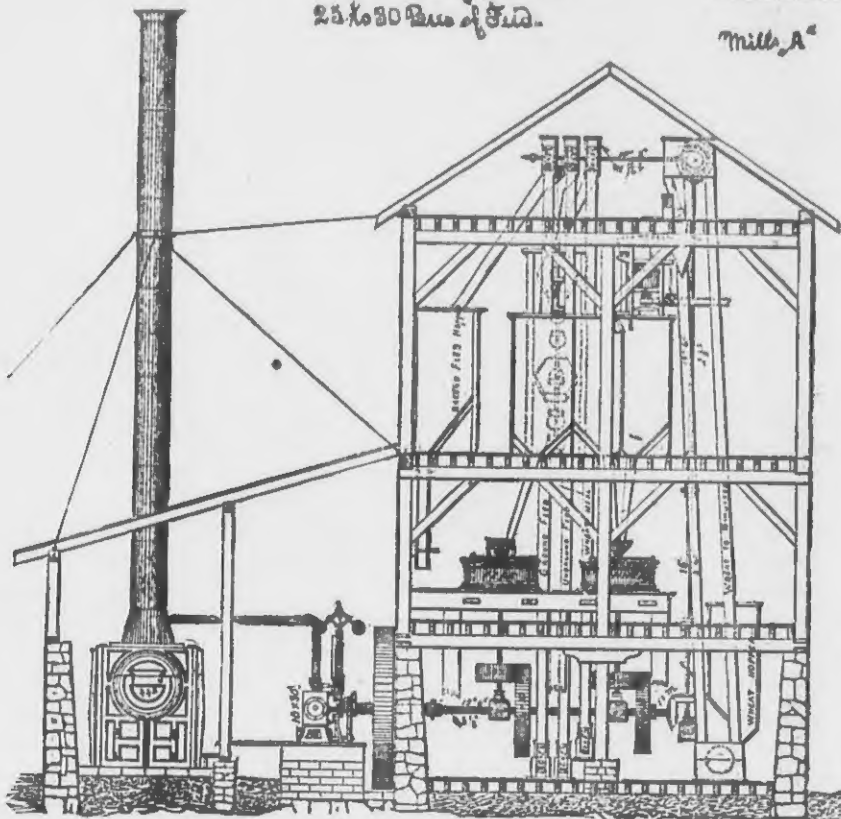
Some discussion was had upon relative value of winter wheats for milling purposes.

## 2 Run Mill

Capacity per hour:  
1 to 15 Bbls of Flour &  
25 to 30 Bbls of Feed.

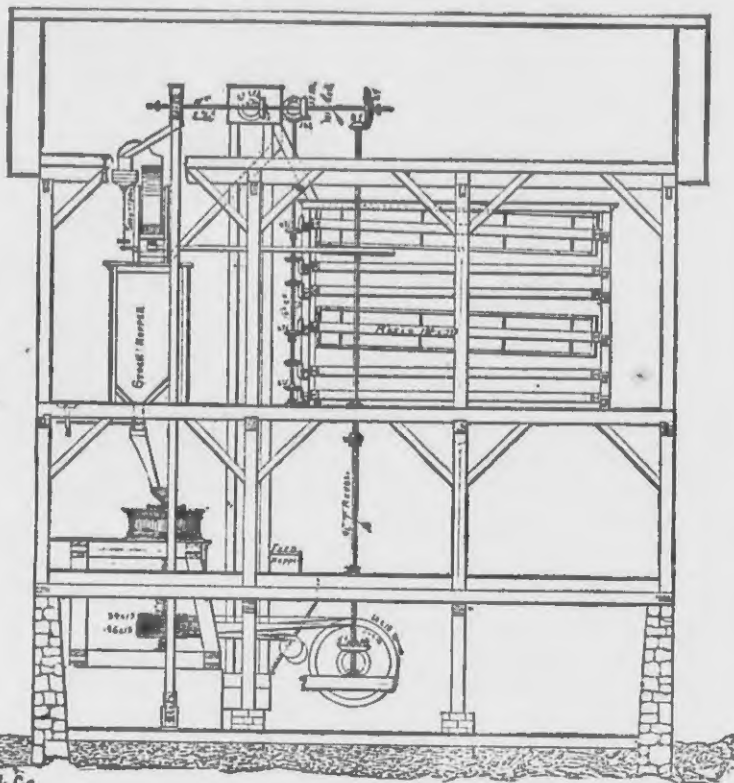
25 Horsepower  
Mill "A"

Consumption of Fuel per hour:  
Reynolds-Corliss Engine, high pressure  
45 lbs. of Steam-Boiler oil  
0.056 Cord of Mixed Wood



END ELEVATION

E. P. Allis & Co.  
Milwaukee, Wis.



SIDE ELEVATION

50 lbs. of steam coal or about one-half cord of good wood. Water power can be used to drive this mill, in place of the engine where required.

The mill consists of 2-run of 48-inch old stock French burr millstones, one used for grinding wheat and the other for grinding corn and feed. The stones are driven by  $\frac{1}{2}$  turn belt from line shaft, and either may be stopped or started, without stopping the engine. The stones rest on a wood hurst frame, and are covered by walnut finished curbs, the heat stone having a silent feeder and the cold stone a hopper, shoe and damson. The bindles are of cast iron, cast on end, and the amputs, what are known as copper lined top

ft. The bolts, elevators and smutter are driven from an upright shaft, which is geared to the line shaft in basement by key mortice or core bars and pinion with pressed teeth. This shaft rests on a heavy steel step and is supported at each floor by boxes. The main shaft in basement is coupled direct to engine shaft, and supported on a line of bolts, by brackets. The smut separating machine stands on top of the stock hopper second floor. The wing chest stands second floor and contains two reels 32 inches diameter and 12 feet long, with

ble conveyors under each reel, and is driven by upright shaft and mitre gear, from shaft in attic. There are four elevators in the mill. The wheat is taken in wheat elevator on grinding floor, and passed into the top of the wheat elevator which takes it up to the attic and spouts it into the smut separating machine, from which it passes down into the stock hopper over the wheat. The meal from the wheat stone is taken into an elevator and taken to the bolts. Corn or feed is taken into a hopper on grinding floor and elevated into stock hopper

find support for their opinions in the failure of the boilers of the Czar's yacht *Livadia*. This vessel was to have had eight main boilers of steel. Six of these were finished and ready for hydraulic test of 150 lbs. per square inch. On the pump being set to work the first boiler split through the solid steel plate, the longitudinal crack being about three ft. long, the pressure reached being 140 lbs. The whole of the boilers were, we understand, thereupon condemned. It was determined, however, to proceed with the test, and three more boilers were easily burst with pressure varying, we are told, between 80 and 140 lbs. The plates were of Cammel's steel. This experiment will go far to cause the total rejection of steel by shipowners as a material for boilers. It is

constitution was adopted, and his connection with the organization ceased.

Remarks were also made by the Chairman, Mr. Barns, and farther explanations given by Mr. Mills.

Upon a call of names there were 15 mills represented.

Considerable discussion was had upon the question of the advantages and disadvantages of keeping up the state organization. The question was taken upon a call of yeas and nays and decided by a very decided vote, which was afterwards made unanimous, that the state association be retained.

A committee on nomination of officers was chosen, which retired for consultation, and soon returned with the following report, which

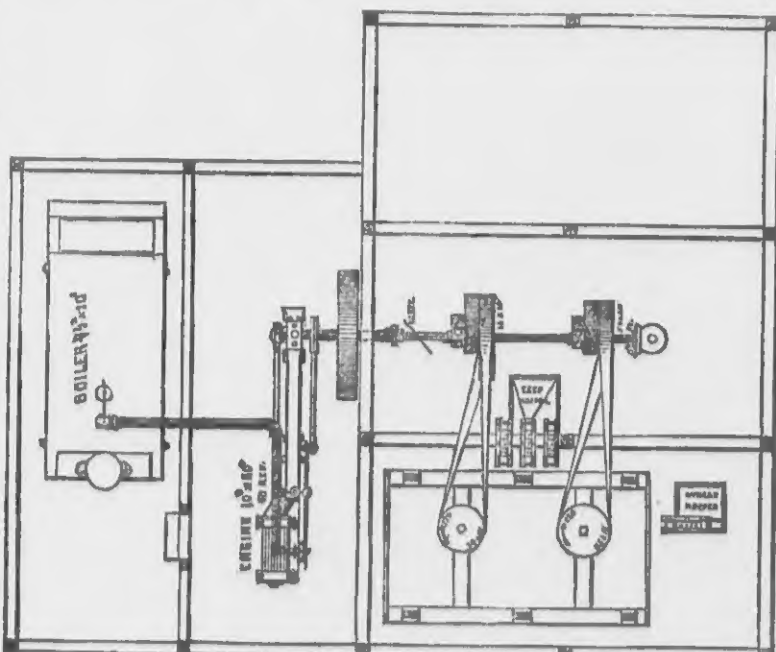
The meeting adjourned to meet at Grand Rapids at a date to be fixed by the president and secretary.—*Kalamazoo Gazette*.

## An Engineering Triumph.

The Suspension Bridge Journal has the following particulars of the reconstruction of the famous bridge across the Niagara river: "The work of transforming the Railway Suspension Bridge from a wooden to an iron and steel structure has been going on for four months, and it is now so far completed that the new has replaced the old in every vital point; all that now remains is to complete the adjuncts and to readjust the symmetry of this rare mechanism. The rebuilding of this structure, though a great work, was not necessarily

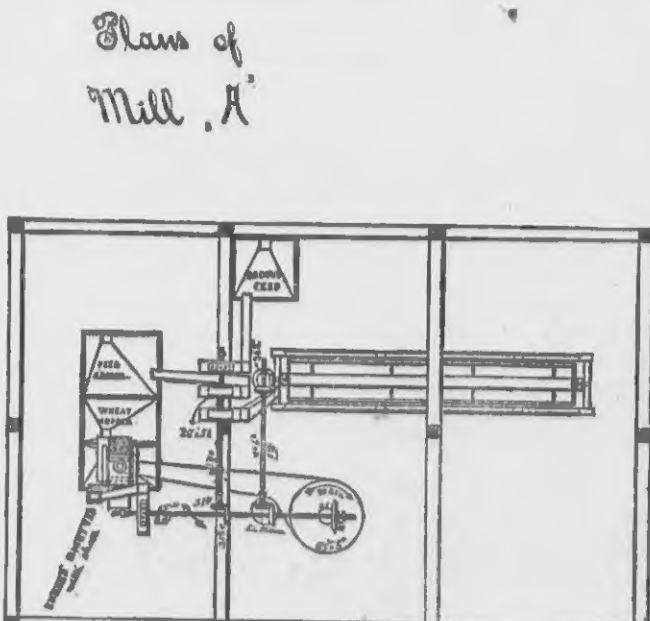
a difficult one, but its marvelous feature consists in the fact that it has been rebuilt without suspending its use for a day, an hour or a moment. The writer of this was informed months ago by one of the leading directors of the company that many prominent engineers doubted the practicability of the plan which had been performed, but he said that Engineer E. A. Buck was so confident of the feasibility of the plan, that the Company decided to let him undertake it, and the result thus far has fully proved the wisdom

of the decision, and demonstrated the ability of Mr. Buck, as an engineer in a manner to silence all cavil. As the reader will imagine the building of this structure has been a great work, but it has been conducted with such perfect system, order and regularity, as to excite but little attention, and thousands, who have passed while the work progressed, have supposed that only a little repairing was being done. And, as a matter of fact, the bridge has been rebuilt much after the fashion of repairing. Of its thousands of bearing and supports, only two have been suspended at one time, and in this way the whole of the old wooden structure has been replaced by an iron and steel one.



BASEMENT

E. P. Allis & Co.  
Milwaukee, Wis.



ATTIC

Plans of  
Mill "A"

also stated that experiences recently acquired are all against steel as regards the durability of furnace plates, and some eminent marine engine builders will not employ it on any terms.—*Iron Age*.

## Meeting of Michigan Millers' Association.

A special meeting of the association was held at the Burdick House in this village yesterday, (Friday) p. m., to take action upon the question of continuing the organization and its connection with the national association, and such other business as should come before the meeting.

was unanimously accepted and adopted:

President—D. B. Merrill, Kalamazoo.  
1st Vice President—Wm. Hayden, Tecumseh.  
Secretary and Treasurer—Frank Little, Kalamazoo.

Executive Com.—E. Bradfield, Ada; Chas. S. Barnard, Niles; J. Hoffman, Three Rivers; W. H. McCourtie, Kalamazoo; C. G. A. Voigt, Grand Rapids.

Com. on Patents—H. A. Hayden, Jackson; Jacob Barns, Grand Rapids; D. R. Hamilton, White Pigeon; W. W. Hatch, Lowell; D. Frazier, Constantine.



## The Adhesion of Belts.

J. H. Cooper, a well-known writer, has the following in the *Boston Journal of Commerce*:

The driving power of belts—by which we mean the holding on to, the adhesion, or that which imparts motion to a belt while in contact with a revolving pulley—has been attributed to various causes, to one of which I wish to refer—that of atmospheric pressure. It is called to mind now by reading some articles in late issues of your paper, which lay great stress upon the efficacy of this means of creating adhesion. This announcement is much like that startling physiological statement of the many tons of pressure imposed upon the human body by the atmosphere, which is very taking to the sense until better known.

A belt has a movement to and from a pulley with perfect freedom, regardless of the atmosphere, touching it as its form, pliability and strain permit, and holding to it according to the interposed agent, adhesive, or what not, which has been spread over the surface of the belt and pulley. The kind of adhesive used has much to do with the driving power of belts. Suppose fine lubricating oil be employed on clean surfaces of belt and pulley; this will effectually exclude air from the surface of contact, but the driving power will be reduced to a minimum, if there be any at all transmitted. If dry dust of yielding material be employed on clean surfaces of belt and pulley, then indeed will the air and dust diminish driving power. There are conditions of belt driving where it is alleged the interposed film of air lessens adhesion. Upon this, Rankin says: "It is well known, through practical experience, that a belt for communicating motion between two pulleys, requires a greater tension to prevent it from slipping when it runs at a high than at a low speed. Various suppositions have been made to account for this, such as that of the adhesion to the belt of a layer of air, which, at a very high speed, has not time to escape from between the belt and pulley. But the real cause is simply the centrifugal force of the belt, which acts against its tension, and therefore slackens its grip on the pulleys."

In collecting belting facts and figures, during the past score of years, for my own use, I met with several statements, asserting with great confidence the doctrine of suction, as the chief cause of attachment between pulley and belt; but I could not find anywhere written a statement of reasons why such force did not act according to the circumstances of belt driving, nor could I discover any appeal to experiment, which, by removing the atmosphere, in this case, putting suction outside the apparatus, and thus settling once for all, the value of vacuum for belt driving.

It is very true, that if the belt does not touch the pulley, it cannot pull it around, nor can it be driven by the pulley. It is also true, that if belt and pulley touch on a limited area only, each can drive the other with a force but a part of what it is capable of doing, and it is only when contact is made perfect—that is, when every square inch of the belt, so to speak, is down solid on the pulley surface, which surface we will grant is very smooth—that the greatest driving effect is obtained. These things being so, are we yet warranted in concluding that the imparting of motion from belt to pulley, and pulley to belt, is all the work of the air, or rather the effect of its absence from the region of contact, and the presence of it on opposite sides of belt and pulley?

Again, is the driving of the belt in the same direction as that in which the suction is felt? Now, mark, the atmospheric resistance becomes sensible by pulling at right angles to a plane surface of joint which does not admit air. Release the pull, and try to slip the sucker over the surface to which it is applied; it moves freely in any direction, offering no resistance, possessing no adhesion, being in fact, in equilibrium, and, by lifting one edge, can be raised wholly away with ease. The power of the belt does not move in lines at right angles to its contact with the pulley face, but tangent to the pulley circle—parallel to the face of contact. As we slip the sucker freely on the flat wetted surface, so the belt slides on the pulley face; there is no atmospheric pressure manifest in either case.

But has any one tested this matter in a vacuum and made record of the results gained? I have; and, if you will allow me, will quote, from "Use of Belting," what I said about this several years ago: The adhesion of belts to pulleys is frequently attributed to the pressure of the atmosphere; and, to show how much the air influences belts in this particular, the following simple experiments are presented:

Take circular discs of leather, say, three, or four inches in diameter, with a knotted string secured in the centre, and, when well water-soaked, apply it to any level, wetted surface. The boys call this apparatus a "sucker," and it well illustrates the phenomenon of atmospheric pressure, or "suction," as it is usually called. If an effort be made to draw it away from this surface by the string, it will be found resisting very forcibly, but the gentlest pressure will slide it on the wetted surface. It does not offer the slightest opposition to motion in the direction of its face, nor will it resist removal if raised first at the edge and then peeled off. The atmosphere does not press two bodies together when it can get between them. It is only when excluded by a tight joint, that the development of its pressure is possible; and it becomes sensible only when an effort is made to separate them by a force acting at right angles to the plane of their faces. Another experiment shows, that when two level, smooth and clean surfaces, come together, by a motion similar to closing a book—which is like that of a belt coming in contact with its pulley—there will be retained, between the two, a thin film of air; and, while this remains, the contact between the two is imperfect, and the sliding of one over the other is easily performed. Take two iron "surface plates" which have been scraped down to a practically perfect plane, and lay one of these on the other, like a belt goes to a pulley. They will be found not in contact at all, but as if floating one on the other, and the top one will slide off by its own weight, at the slightest inclination of the lower one. Much of this interposed film of air can be displaced by the sliding of one plate on the other, starting, say, at one corner, with the plates in close contact, and carefully pushing one over the other, holding it the while close to, as if to keep the air out. Then indeed, an obstinate resistance to sliding will be felt, and the friction of nearer contact will be made thoroughly sensible. But this way of bringing surfaces into contact has nothing to do with belt action, except to prove the need of plastic surface on belt and pulley, which will enable them to adhere, while in contact, with sufficient force to prevent them from sliding, and at the same time be uninfluenced by the intermedium of air. And, lastly, in order to put the matter to actual test, an apparatus was constructed, such that a leather belt was made to slide on the face of a smooth iron pulley, and also to drive the same iron pulley up to slipping of the belt. In both cases, the adhesion or driving power of the belt was held by a spring balance, so the work of the belt could be observed. Experiments were tried with this mechanism placed in a bell glass jar on an air-pump plate, with and without air in the jar, and if any difference was observed in the adhesion of the belt to the pulley, it had more in vacuum than when the atmosphere was present.

## A New Rival of Mammoth Cave.

Wyandotte cave, in Crawford county, Indiana, near the Ohio river, is now known to be next to the famous Mammoth cave, of Kentucky, in grandeur and extent. Its length is said by some to be twenty-three miles, but more careful estimates have placed it at considerable less—about nine or ten miles. The tortuous routes and difficult passages, which must be followed in making the exploration, make the distance seem greater than it really is. The general character and appearance of the cavern, is similar to that of the Mammoth, and, like the latter, is greatly inferior to the well-known caves in Virginia in beauty. The older portions of the Wyandotte, were known ever since the settlement of the surrounding country. In 1850 an extensive addition was opened up, and recently another large chamber has been explored. Openings are seen which lead to still other chambers, beyond those already known. The structure of this immense cavern differs somewhat from that of other caves. Instead of the funnel-shaped domes formed by surface drainage, found in the Mammoth cave, are extensive halls or chambers, with arched roofs, and on their floors are mounds of loose rocks, corresponding in form to the curve of the ceiling. Some of these apartments are peculiarly grand in appearance. The largest is 1,000 feet in circumference and 245 feet in height, the hill in the centre rising 175 feet above the surrounding level. Other chambers nearly equal this in extent and exceed it in beauty. Among the notable formations may be mentioned a stalagmite, 25 feet in diameter and 30 feet high, and a group of stalactites, forming a semi-circle, having the appearance of a canopy. Gypsum, epsom-salts and flint, in veins and nodules, are abundant in many of the chambers.

## Settlement of Western Lands.

THE DEMAND FOR FARMS UNPRECEDENT IN THE HISTORY OF THE UNITED STATES.

WASHINGTON, September 11.—The settlement of Western lands this year is something unprecedented in the history of the country. General Williamson, the Commissioner of the Land General Office, made an investigation of the records of the business of the past year to-day, and was surprised at the vast amount that had been taken for the fiscal year just closed, especially for homesteads. Below is given a comparative statement of the amount for the past nine years, from which the increase in settlement may be observed. The number of acres sold, which includes pre-emptions under the law and the purchase of fractional quarter sections adjoining homesteads, is shown from the following table:

Year.	Acres.	Year.	Acres.
1871.....	1,380,982	1876.....	640,601
1872.....	1,370,320	1877.....	740,686
1873.....	1,636,266	1878.....	877,586
1874.....	1,041,345	1879.....	622,573
1875.....	745,061	1880.....	1,455,724

The following table shows the amount taken for the respective fiscal years under the Homestead act:

Year.	Acres.	Year.	Acres.
1871.....	4,600,326	1876.....	2,875,909
1872.....	4,671,332	1877.....	2,178,098
1873.....	3,793,612	1878.....	4,418,348
1874.....	3,518,861	1879.....	5,260,411
1875.....	2,356,067	1880.....	6,070,507

The report, as will be noticed, shows the enormous quantity of over 6,000,000 acres taken during the fiscal year closed June 30 last. In view of such a rush for Government lands, it is only a question of a very few years when there will be any available farming land left, especially of the great Northwestern wheat belt.

In addition to the above there have been 2,129,705 acres taken under the Timber act during the year just closed.

## What Coal and Iron Have Done for Britain.

Who can suppose that the destiny of our country has not been profoundly affected by the existence of great coalfields beneath its surface? Even if we possessed no mineral wealth, it is probable that our geographical position would still have insured us a considerable commercial importance as the carriers of the civilized world. Britain happens to occupy the central point in the hemisphere of greatest land, and this fact, aided by its insular nature, could not fail to make it a great mercantile country as soon as navigation, nursed in the Mediterranean, had advanced sufficiently to embrace the whole ocean coasts of Asia, Africa, and America. But without coal and iron we should have been mere merchants, not manufacturers. London, Liverpool, Glasgow, and Southampton might possibly have been not inconsiderable marts for exchanging the products of other countries, and for balancing the trade in raw cotton or sugar from India and America against the textile fabrics and the hardware of France and Belgium. But we should have had no Birmingham, no Manchester, no Sheffield, no Leeds, no Bradford, no Belfast. Our population would not have reached one-half its present size. Lancashire, the West Riding of Yorkshire, and the busy mining district of South Wales would be as thinly inhabited as Marionethshire and Connemara. The Black Country would be a quiet pastoral and agricultural region like the remainder of Warwick and Stafford. We should have no great towns except on the seaboard and the navigable rivers, and even these would only retain a fraction of their existing dimensions. Most of our people would be engaged in farming, and there would be no great wealthy class to crowd into Brighton, Scarborough, Cheltenham, Torquay, and the Scottish Highlands. But this is not all. The difference in our national character would, no doubt, be very great. Coal has stimulated our inventive faculties and our enterprise, and has given an indirect impetus to science and art. Without it we should have had fewer mechanical improvements, fewer scientific discoveries, fewer railways, fewer colleges and schools. All these things have reacted upon our general level of intelligence and taste, and have enabled us to hold our own amongst the most advanced European nations. But without coal and iron we should have fallen back to somewhat the same position as that now held by Holland or Scandinavia, allowance being made for a larger territory in the first case and a thicker population in the second. Our comparatively insignificant numbers would reduce us from the rank of a first-class European power to that of a nation existing on sufferance. Our army and navy would be smaller, our Parliament less important and less stimulating to high ambitions, our churches, our bar, our medical

faculty less advanced in the forefront of thought. Thus we should probably suffer in every respect, producing both absolutely and relatively fewer great men either as thinkers, administrators, discoverers, inventors, or artists. For, when once a nation has fallen behind in the race, the audience addressed becomes smaller, the competition less keen as an incentive to effort, the rewards of success decrease in value, and the general atmosphere of example and rivalry deteriorates in power. Where few books are written, few investigations undertaken, few works of art produced, few and still fewer care to aspire toward a forgotten ideal. Thus, without coal, Britain might have declined from the England of Shakespeare, Milton, and Newton, just as other countries have declined from the Hellas of Pericles and Plato, and the Spain of Cervantes and Velasquez.—*Frazer's Magazine*.

AMBIGUITIES OF LANGUAGE.—We may excuse the foreigner if, in speaking our language, he occasionally misapplies an ambiguous word, however oddly it may sound. Dr. Chambers once entertained a distinguished guest from Switzerland, whom he asked if he would be helped to "kippered salmon." The foreign divine asked the meaning of the uncouth word "kippered," and was told it meant "preserved." Soon after the Switzer made use of this newly-acquired expression in a public prayer, when he offered a petition that a distinguished divine might long be "kippered to the Free Church of Scotland." Here is another example of a possible misconstruction of language. "I fear," said a country curate to his flock, "when I explained to you in my last charity sermon that philanthropy was the love of our species, you must have understood me to say 'specie,' which may have accounted for the smallness of the collection. You will prove, I hope, by your present contribution that you are no longer laboring under the same mistake.—*Chambers' Journal*.

William R. Balch, the Boston newspaper man and detective, and for a short time editor of the *Philadelphia Press*, recently heard a lady say: "I wish somebody would invent a hairpin that would stay in one's hair." And Mr. Balch, being of an accommodating turn, went to work and invented such a contrivance. It is getting so now that a man can't be a successful editor unless he can turn his mind to almost anything. Some day when we get time, we shall invent a pin that won't wound a young man's hand when he puts his arm around a girl's waist to prevent her falling out of a buggy or off a chair.—*Norristown Herald*.

## Fashionable Women's Prayer.

Strengthen my husband, and may his faith and money hold out to the last.

Draw the lamb's wool of unsuspicious twilight over his eyes, that flirtation may look to him like victories, and that my bills may strengthen his pride in me.

Bless, oh, fortune! my crimps, rats and frizzles, and let my glory shine on my paint and powder.

Enable the poor to shift for themselves and save me from all missionary beggars.

Shed the light of thy countenance on my camel's hair shawl, my lavender silk, my point lace, and my necklace of diamonds, and keep the moths out of my sables, I beseech thee, oh, fortune!

When I walk out before the gaze of vulgar men, regulate my wiggle and add new grace to my gait.

When I bow myself to worship, grant that I may do it with ravishing elegance and preserve until the last the lily white of my flesh and the taper of my fingers.

Destroy mine enemies with the gall of jealousy, and eat up with the teeth of envy all those who gaze at my style.

Save me from wrinkles, and foster my plumpers.

Fill both my eyes, oh, fortune! with the plaintive poison of infatuation, that I may lay out my victims, the men, as numb as images graven.

Let the lily and the rose strive together on my cheek, and may my neck swim like a goose on the crystal water.

Enable me, oh fortune! to wear shoes a little smaller, and save me from corns and bunions.

Bless Fanny, my lap-dog, and rain down hail stones of destruction on those who shall hurt a hair of Hector, my kitten.

Smile, oh fortune! most sweetly upon Dick, my canary, and watch with the fondness of a spirit over my two lily-white mice with red eyes.—*Burlington Hawkeye*.



### The Future of Steel.

J. S. Jeans, Secretary of the British Iron and Steel Institute, lately made the following remarks respecting the subject heading this article:

"The more the subject of the manufacture and uses of steel is inquired into, the more does it seem incapable of exhaustion. Great things have been accomplished in the past, but much yet remains in the future. The manufacture of steel is far from finality. Even now some of the leading steelworks in France are essaying the production of ingots of 100 tons weight. Steel, indeed, may be compared, in reference to its multifarious uses, with the elephant's trunk, the adaptability of which enables it with equal ease to pick up a needle or pull up a tree. High authorities have expressed the opinion that steel will have the future nearly altogether to itself, displacing copper for fire-boxes, etc., silver for articles of ornament, and lead for its specific purposes as much as it is superseding iron in respect to utility, economy and endurance. And as it is difficult to set bounds to the ultimate applications of steel, so it is impossible to limit the means of its production. Recent metallurgical progress has indefinitely increased the resources available for the latter purpose. Science has at last found a method of ridding of their deleterious contents the ores of iron heretofore unsuited for the manufacture of steel, and henceforth, if metallurgists of experience are not greatly deceiving themselves, the cheapest and most plentiful ores will, by one of the greatest chemical triumphs of the age, be raised to the same rank as the richer and comparatively limited ores that have alone been deemed fit for steel manufacture until now. The horizon of the future, therefore, is not bounded by any limitation of the supplies of raw material. Nor is it any more likely to be measured by the uses of steel, for they are multiplying every day, and as the manufacture is cheapened and improved, so will the applications continue to increase. In the track of this movement many changes must follow, and have even already occurred, of which we have been able to take but scant cognizance. The hard and irksome work of the puddler has been superseded by less arduous, and, in the main, by less skilled labor. One of our greatest authorities has calculated that to convert fluid cast iron into steel, the labor required is only about one-third of that needed to convert pig metal into wrought iron, while the fuel consumed is only about one-fourth of that formerly used. The economy of coal is, therefore, another important corollary of the advance of steel; and this economy, great though it be in the aggregate, is trifling in comparison with that accomplished through the greater strength and endurance of that which we are fully justified in describing as the metal of the future."

### Items of Interest.

A Cincinnati firm proposes to establish telephonic communication across the Atlantic ocean, for which purpose an effort will be made to secure the new French line. Tests will be made from New York City, and, if successful, the line will be made permanent.

The census returns from Texas indicate that the population of that State, which in 1870 was 818,579, has been doubled in ten years. In the opinion of many, Texas is destined to become the empire State of the Union.

A novel locomotive is being built at Concord, N. H. The boiler, instead of being round, is flat—some two feet thick by seven inches wide, and twelve feet long—the tubes running horizontally. This boiler rests over the fire-box, and in the middle of the locomotive, the engineer's position being in a little cab, similar to a wheel-house on a steamer, at the forward end, while the fireman's place is at the opposite end as now, the whole machine being considerably longer than the largest at present used.

Mr. George R. Stuntz, as one of the committee appointed by the Chamber of Commerce at Duluth, Minn., made a report in February, 1880, on the project for a canal from Duluth to the Mississippi, and thence across the summit to Red lake and the navigable water of the Red River of the North. Mr. Stuntz went over the route on a reconnaissance without instruments, and made an estimate of the length of canal required, and the distance of slackwater and lake navigation. Of canal, the whole number of miles is 37; of river and lake channel, 345; total length, 382 miles. The number of locks is 1111, of dams, 56, and Mr. Stuntz estimated the cost at \$2,201,000. The Buffalo Board of Trade in

March last passed resolutions asking Congress to appropriate \$30,000 for the survey of the route. It is said that the completion of the proposed improvements will connect 5,000 miles of lake and canal navigation, terminating at New York and Quebec, with 5,000 miles more, including the waters of the Red River of the North, lake Winnipeg, and the Saskatchewan.

The extent of rich uncultivated land in the Delta of the Mississippi River is not generally known. On this point General Abbott, of the United States Engineers, says: "The total area of the bottom lands is about thirty-two thousand square miles, of which a mere narrow strip along the main stream, and its principal tributaries and bayous, has been heretofore open to cultivation. Protected against the river and properly drained this would render available at least 2,500,000 acres of sugar land, or more than double the amount heretofore planted, about 7,000,000 acres of the best cotton land in the world, capable of yielding a bale to the acre, and not less than 1,000,000 acres of corn land of unsurpassed and inexhaustible fertility."

### A Valuable Invention.

A new screw, which promises to have an important place in the market in the near future, and which the established companies feel a natural interest in discouraging. It is a well-known fact that the great bulk of the screws used are set in with the hammer, and given a turn or two with the screw-driver to bring them flush. Recognizing this fact, an ingenious inventor, for many years somewhat prominently identified with the business, has brought out a new screw, which is adapted for driving, and which enters the wood without tearing the grain. The gimlet point is dispensed with, and a cone point substituted. The thread has such a pitch that it drives in barb fashion, offering no resistance in entering, but firmly resisting all attempts to withdraw it except by turning it out with the screw-driver. The head is flat, but in setting it up two nipples or square-shouldered projections are raised in it by the one operation. The screw-driver takes hold of them more easily than it does of the customary nick, and holds quite as firmly, and when driven flush the projections on the head are not in the way, and do not disfigure it. It is claimed that this screw can be made one-third cheaper than ordinary screws, the principal saving being effected in doing away with the necessity for sawing the nick in the head. This consumes more time than any other one item of the manufacture, and is very destructive of saws, which are expensive and have to be kept on hand in large quantities. This new screw is intended for all kinds of cheap work, and is said to be very favorably regarded by consumers on account of the low price at which it can be sold, as well as because it is adapted to be used legitimately in a way in which the great bulk of the screws consumed are used illegitimately. It is probably the most important hardware novelty which has been brought out for some years.

A liquid fuel for steamships and locomotives is attracting the attention of scientists in Europe and Asia. It has been tried with complete success on the fastest Russian mail-boat on the Caspian Sea, and it is to be adopted on the locomotives of various Asiatic lines. The fluid is simply the refuse of petroleum oil, which is carried in an iron tank and blown into spray inside the furnace by a jet of steam, where it burns with a roaring sheet of flame. Such a means of combustion requires no stoking, and the flame can be manipulated like a jet of gas, and the steam pressure is easily regulated and kept constant. Moreover, there are no ashes, and the smoke is free from sulphur.

VICTORIA ELEVATOR, BERLIN.—The erection of this elevator was undertaken with the view of reducing the heavy warehouse expenses charged in Berlin. The building covers a space of about 25,000 square yards and is five stories high, with a capacity of one million bushels. It has a frontage to the canal of 200 yards, and is constructed on iron columns with a patent fire-proof roof of cement. It has been found impossible to build it on the American principle owing to the difficulties interposed by local legislation. Where wooden stairs would suffice, expensive stone steps have to be constructed, and the use of elevators from floor to floor is made impossible by the restrictions, which require fire-proof partitions to divide the building in so many places.

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### Foreign Items.

The best Hungarian wheat of the 1880 crop weighs 64 pounds to the bushel.

A \$200,000 pearl barley mill is being erected in Budapest. The company erecting it is styled the First Hungarian Pearl Barley Mill Co.

A floating mill on the river Rhine was recently struck by lightning and floated down the stream until it burned to the waters' edge.

A million bushel elevator has just been completed in Vienna. It is built much after the American plan.

Messrs. Mayer, Kraus & Sons have just completed the erection of a 1,200 barrel roller flouring mill in Buda-Pesth, Hungary. It contains 50 roller mills, 12 run of stones and 80 purifiers. The mill was constructed after plans made by that eminent milling engineer Mr. Adolf Fischer, of Buda-Pesth. The roller mills were from the establishment of Messrs. Ganz & Co. The machinery is driven by a 500 horse-power engine.

The Ford Mill at Ventor, England, burned recently. Loss, \$5,000.

Messrs. Ganz & Co. have recently refitted the Louise Mill, of Buda-Pesth, with rollers and other machinery.

As the results of the extremely bad weather experienced all over Germany during the critical periods of the harvest become known, it is found that the damage to the ripening crops has exceeded the worst auguries. The damage, following upon the blight of the rye crop,—which is Germany's staple breadstuff,—has produced a very depressing effect on German farmers and peasantry.

A patent has been taken out in Germany, by Mr. J. F. Jensen, of Flensburg, for the complete decortication of grain before grinding. The main feature in the process is that the grain is passed through a hulling machine consisting of a series of conical funnels, and as it issues from each spout it is subjected, in passing, to the action of strong jets of steam. It is then carried to a conical shelling stone which completes the process. Professor Kick says that this invention will find but little use, because the excessive damping of the grain exercises so prejudicial an effect on the gluten in the outer layers of the berry; and, besides, owing to the crease in the berry the operation is always incomplete. Like the discoverers of perpetual motion, he says, the inventors of complete decortication will never die out.

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## Salmon Fishing.

PERILS OF AN IMPORTANT INDUSTRY—HUNDREDS OF LIVES SACRIFICED YEARLY ON THE BAR OF THE COLUMBIA RIVER—DROWNING THE CHINAMEN.

The business of fishing for salmon on the Columbia river is a highly dangerous one, if the fishermen just returned from the canneries speak the truth. Some assert that as many as three hundred and fifty fishermen lost their lives this season on the Columbia. The lowest estimate is furnished by William Johnson, who puts the number of victims at two hundred. Ellis has fished for years on the Columbia. He has been employed at times by the fish commissioners to hatch out young salmon, and is regarded as authority in piscatorial affairs. He states that the last season on the Columbia was a most dangerous one to all interested in it. The run of fish commenced several weeks later than usual, and in consequence the canneries discharged the majority of their hands. Late in July the fish came up from the sea in such numbers that, in the hyperbole of Ellis, "you could walk across the river on 'em. Be heavens, the water was stiff with 'em."

Over thirty million pounds of fish were taken from April 1 to July 31, when the season closed. During the season of abundance few lives were lost, as there was no necessity to take any risks. Fish could be found in all parts of the stream. It was during the early part of the last season, when salmon were scarce, that the uneasy bar swallowed up its daily sacrifice. A few weeks of warm weather sent the snows into the Columbia in torrents, and the great river rushed down to the ocean, swollen and turbulent. Great tracts were inundated and the tides affected. The latter disturbance of nature was what proved fatal to the fishermen. They watch the tides carefully, for at slack water the fish are easiest caught. Leaving their stations at the ebb tide, they shoot out their huge seines three hundred and three hundred and fifty fathoms in length, and drift down the river, to be floated back on the flood. It is an important matter with them to know exactly when the tide shall turn. The best fishing ground is close to the bar, and they want to venture no further. This year the tide-table was not to be relied on. The great body of water thrown by the Columbia into the ocean delayed the floods, so that the fishermen were sometimes half an hour and an hour ahead of time. Believing that they were on the last of the ebb they drifted down and found themselves close to the bar in a tide rushing out at the rate of eight knots an hour. To pull their heavy twenty-four foot boats against such a current was a feat few of them were capable of, and the only course open to the majority was to face death with a fortitude. Others perished from the desire of gain. Some fishermen having a heavy boat would venture out on dangerous waters and return with a great catch of fish. Next day others who had toiled for days, perhaps, with indifferent success, would follow the bad example, to be heard of no more. The majority of the fishermen are old sailors, and, with the recklessness of their class, are disposed to take desperate chances. A spirit of emulation proved fatal to many. Some fisherman, anxious to display his seamanship and bravery, would venture out further than was safe. Some other aspirant, for a small degree of fame along the shores of Astoria, and would go still further, and so the contest would proceed, until several canneries would be minus boats and nets. The majority, however, perished through fatal mistakes with regard to the tides. The great storm on the 2d of May swelled the list of casualties to an alarming size. Johnson and Ellis happened to be up the stream some distance; McKenna and Berette were, however, close to the bar. The Italian, after a sharp run for his life, escaped to the shore, but McKenna was swept over the bar. Finding himself in the jaws of death, he seized the only chances left him, and in his open boat stood straight out to sea. But this means he escaped immediate death, but nearly died from starvation, as he was three days outside of the bar without food. He has fished for many years on the Columbia, but he says: "I've done with it; it's too risky for me." He asserts that in that memorable gale sixty men were lost. "The cannery men," he assured a *Chronicle* reporter, "never report half the men lost. All they care for is to get their boats back, and if they do it's all right. If they don't, what's the good of ever talking about it? It won't get them the boat and it may keep away fishermen next year."

The official report of 1878-9 gives the num-

ber of boats belonging to the canneries as eight hundred. There are over fourteen hundred boats engaged on the Columbia—some say sixteen hundred. Many farmers have several boats, and other parties own their own craft and supply salmon to the canneries. Of this private fleet the canneries know little, and are certainly not under any obligations to keep a watchful eye on other people's employes with a view to furnishing them to the newspapers. The terrors of poverty, as well as of the tide and storm, hung over the unfortunate fisherman this year. Many of them were unable to pay their board bills. Usually they clear a few hundred dollars to fortify them against the winter. The price of a fish is fifty cents, of which the cannery retains one-third for supplying the boat and net, valued at \$625.

The thirty-five canneries on the Columbia river employ about 4,000 Chinamen in preparing fish for the market. It is safe to say that, were the work done by white hands, there would be employment for 2,000 girls and boys labeling cans and other light work. The Chinese get \$30 a month, and are growing so independent that they struck several times this year for higher wages, and on different occasions offered violence to their employers. They never venture on the river, for the fishermen are not the class to tamely submit to such competition. Some years ago a few adventurous Mongolians joined the fleet, but they disappeared the same night. Their boats were broken to pieces, and their nets cut up and scattered on the beach. The fishermen made no attempt to conceal the fact that they had drowned the intruders, and the authorities never investigated it. The work would have been idle.

## Nicodemus Dodge.

When I was a boy in printing office in Missouri, a loose-jointed, long-legged, tow-headed, jeans-clad, countrified cub of about sixteen, lounged in one day, and without removing his hands from the depth of his trousers pockets, or taking of his faded ruin of a slouch hat, whose broken brim hung limp and ragged about his ears like a bug-eaten cabbage leaf, started indifferently round, then leaning his hip against the editor's table, crossed his mighty brogans, aimed at a distant fly from a crevice in his upper tooth, laid him low, and said with composure:

"What's the boss?"

"I am the boss," said the editor, following this curious bit of architecture wonderingly along up to its clock face with his eye.

"Don't want anybody fur to learn the business, 'taint likely?"

"Well, I don't know. Would you like to learn it?"

"Pap's so po' he can't run me no mo', so I want to get a show som'ers if I can, 'taint no difference what—I'm strong and hearty, and I don't turn my back on no kind of work, hard nor soft."

"Do you think you would like to learn the printing business?"

"Well, I don't rely k'yer a darn what I do learn, so's I get a chance fur to make my way. I'd jist as soon learn printin's any thing."

"Can you read?"

"Yes—middlin'."

"Write?"

"Well, I've seed people who could lay over me thar."

"Cipher?"

"Not good enough to keep store, I don't reckon, but as far as twelve times twelve I ain't no slouch. 'Tother side of that is what gits me."

"Where is your home?"

"I'm from old Shelby."

"What's your father's religious denomination?"

"Him? Oh, he's a blacksmith."

"No, no—I don't mean his trade. What's his religious denomination?"

"Oh—I didn't understand you befo'. He's a Freemason."

"No, no—you don't get my meaning yet. What I mean is, does he belong to any church?"

"Now you're talkin'. Couldn't make out what your was trying to git through yo' head no way. B'long to a church! Why, boss, he's been the pizenest kind of a Free-will Baptist for forty years. They ain't no pizenest ones'n he is. Mighty good man, pap is. Everybody says that. If they said any-different they wouldn't say it where I wuz—not much they wouldn't."

"What is your own religion?"

"Well, boss, you've kind o' got me thar—and yet you ain't got me so mighty much nuther. I think 't if a feller he's another

when he's in trouble, and don't cuss, and don't do any mean things, nor nothin' he ain't no business to do, and don't spell the Savior's name with a little g, he ain't runnin' no res's,—he's about as saift as if he b'longed to church."

"But suppose he did spell it with a little g—what then?"

"Well, if he done it a-purpose I reckon he wouldn't stand no chance; he oughtn't to have no chance, any way, I'm most rotten certain 'bout that."

"What is your name?"

"Nicodemus Dodge."

"I think maybe you'll do, Nicodemus. We'll give you a trial any way."

"All right."

"When would you like to begin?"

"Now."

So, within ten minutes after we had first glimpsed at this nondescript, he was one of us, and with his coat off and hard at it.

Beyond that end of our establishment which was the furthest from the street was a deserted garden, pathless, and thickly grown with the gloomy and villanous "jimpeon" weed and its common friend the stately sunflower. In the midst of this mournful spot was a decayed and little "frame" house with but one room, one window and no ceiling—it had been a smoke-house a generation before. Nicodemus was given this lonely and ghostly den as a bed chamber.

The village smarties recognized a treasure in Nicodemus right away—a butt to play jokes on. It was easy to see that he was inconceivably green and confiding. George Jones had the glory of perpetrating the first joke on him. He gave him a cigar with a firecracker in it, and winked to the crowd to come; the thing exploded presently and swept away the bulk of Nicodemus' eyebrows and eyelashes. He simply said:

"I consider them kind of seeg'yars dangerous," and seemed to suspect nothing. The next evening Nicodemus waylaid George and poured a bucket of ice-water over him.

One day, while Nicodemus was in swimming, Tom McElroy "tied" his clothes. Nicodemus made a bonfire of Tom's by way of retaliation.

A third joke was played upon Nicodemus a day or two later—he walked up the middle aisle of the village church, Sunday night, with a startling handbill pinned upon his shoulders. The joker spent the rest of the night, after church, in the cellar of a deserted house, and Nicodemus sat on the cellar door till toward breakfast time, to make sure that the prisoner remembered that if any noise was made some rough treatment would be the consequence. The cellar had two feet of stagnant water in it, and was bottomed with six inches of soft mud.

But I wander from the point. It was the subject of skeletons that brought this boy back to my recollection. Before a long time had elapsed the village smarties began to feel an uncomfortable consciousness of not having made a very shining success of their attempts on the simpleton of "old Shelby." Experiments grew scarce and chary. Now the young doctor came to the rescue. There was delight and applause when he proposed to them the plan of frightening Nicodemus to death, and explained how he was going to do it. He had a noble new skeleton—the skeleton of the only local celebrity, Jimmy Finn, the village drunkard—a grisly piece of property he had bought of Jimmy Finn himself, at auction, for fifty dollars, under great competition, when Jimmy lay very sick in the tanyard a fortnight before his death. The fifty dollars had gone promptly for whisky, and had considerably hurried up the change of ownership in the skeleton. The doctor would put Jimmy Finn's skeleton in Nicodemus' bed.

This was done about half past ten in the evening. About Nicodemus' usual bed time—midnight—the village jokers came creeping stealthily through the jimpeon weeds and sunflowers toward the lonely frame den. They reached the window and peeped in. There sat the long-legged pauper on his bed in a very short shirt and no mere. He was dangling his legs contentedly back and forth, and wheezing the music of "Camptown Races" out of a paper overlaid comb which he was pressing against his mouth; by him lay a new jewsharp, a new top, a solid india-rubber ball, a handful of painted marbles, five pounds of "store" candy and a well-knawed slap of gingerbread as big and thick as a volume of sheet music. He had sold the skeleton to a traveling quack for three dollars, and was enjoying the result.—From *Mark Twain's New Book, "A Tramp Abroad."*

SUBSCRIBE for the U. S. MILLER.

## "Millions in it."

The following amusing note, by Mark Twain, on the last gold fraud of California, might be applied to quite a number of mining "propositions" that have reached the market: Mark Twain on the gold-bearing water.—How he worked the Calistoga Springs, and what he knows about a wonderful gold-bearing wind.

To the Editors of the Evening Post:

I have just seen your dispatch from San Francisco, in Saturday's *Evening Post*, about "Gold in Solution" in the Calistoga Springs, and about the proprietor's having "extracted \$1060 in gold of the utmost fineness from ten barrels of water" during the past fortnight, by a process known only to himself. This will surprise many of your readers, but it does not surprise me; for I once owned those springs myself. What does surprise me, however, is the falling off in the richness of the water. In my time, the yield was a dollar a dipperfull. I am not saying this to injure the property, in case a sale is contemplated; I am only saying it in the interest of history. It may be that this hotel proprietor's process is an inferior one—yes, that may be the fault. Mine was to take my uncle—I had an extra uncle at that time, on account of his parents dying and leaving him on my hands—and fill him up, and let him stand fifteen minutes, to give the water a chance to settle well, then insert him in an exhausted receiver, which had the effect of sucking the gold out through his pores. I have taken more than eleven thousand dollars out of that old man in a day and a half. I should have held on to those springs but for the badness of the roads and the difficulty of getting the gold to market.

I consider that gold yielding water in many respects remarkable; and yet not more remarkable than the gold-bearing air of Catgut Canon, up there toward the head of the auriferous range. This air, or this wind—for it is a kind of trade-wind which blows steadily down through six hundred miles of rich quartz croppings during an hour and a quarter every day except Sundays—is heavily charged with exquisitely fine and impalpable gold. Nothing precipitates and solidifies this gold so readily as contact with human flesh heated by passion. The time that William Abrahams was disappointed in love, he used to step out doors when that wind was blowing, and come in again and begin to sigh, and his brother Andover J. would extract over a dollar and a half out of every sigh he sighed, right along. And the time that John Harbison and Aleck Norton quarreled about Harbison's dog, they stood there swearing at each other all they knew how—and what they didn't know about swearing they couldn't learn from you and me, not by a good deal—and at the end of every three or four minutes they had to stop and make a dividend; if they didn't, their jaws would clog up so that they couldn't get the big nine-syllabled ones out at all; and when the wind was done blowing, they cleaned up just a little over sixteen hundred dollars apiece. I know these facts to be absolutely true, because I got them from a man whose mother I knew personally. I do not suppose a person could buy a water privilege at Calistoga now at any price; but several good locations along the course of the Catgut Canon Gold-Bearing Trade-Wind are for sale. They are going to be stocked for the New York market. They will sell, too; the people will swarm for them as thick as Hancock veterans—in the South.

MARK TWAIN.

HARTFORD, CONN., Sept. 14.

LEAD POISONING BY FLOUR.—A rather serious epidemic of lead-poisoning was recently discovered in the Taunton sanitary district, caused by the holes in millstones having been filled up with lead. The practice appears not to be confined to this country. In the last number of the *Nordiskt Arkiv* is a paragraph, taken from a Norwegian periodical, in which it is stated that Dr. O. Johnson, of Sarpsborg, has met with an extensive endemic of gastric disorder, often accompanied with diarrhoea, for which he could find no cause in the local conditions; nor was there any evidence of contagion. The lead-lines on the gums was detected, and it was ascertained that the flour which the patients used had been procured from a mill, the owner of which had filled up the holes in the millstones with a mixture of white lead and glycerine. There was no cases of paralysis or brain disease, and the patients, with the exception of one who died, all recovered. A similar occurrence is reported to have taken place in France from the use of lead to repair millstones.—*The Miller* (London).

On a recent Saturday evening a man stepped into a grocery store at Northampton, Mass., with a bundle containing a pair of boots, which he laid down for a moment. Near by were several lobsters, which had been done up for a lady from a neighboring village, making a package similar in size to the other. By some chance the owners changed bundles, and the gentleman, after having nearly reached home, found his "boots" suspiciously moist, and took them back to the store. But the lady went home, placed the supposed lobsters on ice, in order to keep them in good condition for dinner, and did not discover the mistake until just before dinner time.



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We send out monthly a large number of sample copies of THE UNITED STATES MILLER to millers who are not subscribers. We wish them to consider the receipt of a sample copy as a cordial invitation to them to become regular subscribers. We are working our best for the milling interest of this country, and we think it no more than fair that our milling friends should help the cause along by liberal subscriptions. Send us One Dollar in money or stamps, and we will send THE MILLER to you for one year.

## MILLERS' DIRECTORY FOR 1880.

All mill-furnishers, flour brokers or other parties desiring to reach the flour mill owners and millwrights of the United States and Canada, should have a copy of the above named work. It contains about 15,600 names with Post-office addresses, and in many cases (notably in Wisconsin and Minnesota) gives the number of runs of stone, sets of rollers, and kind of power used, or the capacity in barrels. A limited number of copies only have been printed. Upwards of 75 of the leading mill-furnishing houses and flour brokers in this country and several in Europe have already secured copies. Send in your orders at once. Price Five Dollars, on receipt of which Directory will be forwarded post-paid by mail, registered. Address

UNITED STATES MILLER,  
MILWAUKEE, WIS.

THE Millers' Associations, Germany, have recently held a meeting of considerable length at which papers of much interest were read.

MONROE, the *Millers Journal* representative, with headquarters in Chicago, makes it a point to visit our fair "City of Bricks" occasionally. He is always welcome.

In our November number we will publish the laws of Wisconsin in regard to flouring mills. Every miller in the State should obtain and preserve a copy of it.

Messrs. Hulbert & Paige of Painesville, O., report business booming. They are building

a number of fine flouring mills in different portions of the country and the result of their labors is highly spoken of.

If you are not already a subscriber to the UNITED STATES MILLER, send one dollar at once and begin with our Nov. number, which commences the tenth volume.

OUR many readers will note, in this paper, with interest the advertisement of the new middlings purifier manufactured by the Case Manufacturing Co., of Columbus, Ohio. We have not had the pleasure of seeing one of the new machines but those who have, speak kind words for its future.

THE *Northwestern Trade Bulletin*, of Milwaukee, is the best commercial paper published in the State. It is sought for and eagerly read by merchants, grain dealers and farmers throughout the Northwest. Its market quotations are invariably correct and the paper is of great value on that account. It is not published with interest of any ring or clique but is exactly what it claims to be, a bulletin of the trade of the Northwest.

A PROPOSITION to lower the present grades, No. 1, No. 2, No. 3 and No. 4 red winter wheat, one half grade, to take effect January 1, 1881, was voted on Sept. 28 by members of the Merchants' Exchange, of St. Louis, and adopted by a vote of nearly 2 to 1. The contest was the most exciting, that has occurred on 'change for several years, and quite a number of the most prominent and influential members of the Exchange took an active part in it.

ACTIVE preparations are said to be being made for the holding of a great exhibition of milling machinery in London, England, 1881. If the scheme is carried out the American milling machinery men and the members of the milling press will undoubtedly be on hand. London is considerably larger than St. Louis, Chicago, Cincinnati, or even Milwaukee, but if any of our boys go they will find out all that is worth finding out in that great city if any one set of men can.

At the last meeting of the British and Irish Millers' Association, the resolution passed at a previous meeting preventing the English milling papers from publishing the regular proceedings was reconsidered, and hereafter the English milling journals will publish the proceedings in full. It did not take long for the millers to find out that they had wantonly kicked at their best friends. The English milling papers, *The Miller*, and the *Corn Trade Journal and Millers' Gazette*, are good papers and deserve the support and patronage of all the millers in the United Kingdom.

THE roller mill system fever is not by any means confined to the United States. The news comes from across the Atlantic that the orders for roller mills have increased in the past year to a tremendous extent throughout all portions of continental Europe and Great Britain. Messrs Ganz & Co., of Budapest, take the lead in the number of orders in Europe. The French millers are said to be not much inclined to the roller system, but nevertheless a great many roller mills are in operation in that Republic.

It is rumored that a milling firm in Minneapolis is soon to build a large flour-mill in Milwaukee. It is said that steam power in Milwaukee can be had about as cheap as water-power in Minneapolis, and if this is really the case we know of no reason why Milwaukee is not by far ahead of Minneapolis as a profitable point for milling. At all times our elevators contain more wheat than our home mills can consume and that of the best quality. Capitalists desiring to invest money in milling should not fail to investigate the advantages offered by Milwaukee.

THE millers associations both State and National are very quiet. The Indiana Association is reported defunct, but will probably be revived during the coming winter. The Michigan millers have re-organized. The Pennsylvania millers will do something this month. We have heard it rumored that some more patent cases will soon come to the front which will cause a ripple of excitement, the particulars of which will probably come to notice before long. If members of associations should be sued by patentees, the organizations will undoubtedly show a good deal of life, but if prosecutions fall off entirely association matters will be very quiet.

SMALL MILLS.—Some time ago, we stated that the milling business of this country was

rapidly going into the hands of large mill owners and to certain great milling centers. A correspondent writes us deprecating this condition of things. We cannot help it, but it is so, and the demand for city made flour by the farmers is rapidly increasing all over the country. Small mills, with a scanty amount of machinery and unskillful help, cannot contend with great mills with the best and most economical machinery to be had. The large mills can afford to pay more for the wheat, and can beat the small mills in quality and quantity of yield. There are, of course, exceptions, and there are and always will be, in many places, a good trade for small millers.

AMERICAN WHEAT TO RUSSIA.—A cablegram from London, dated Sept. 30, says: A profound sensation has been again created in Russia by the second announcement of the Odessa newspaper, *The Nestnik*, that one of the local firms of merchants has purchased, in addition to previous purchases, 100,000 bushels American wheat through a Western American firm. The rate of purchase is 1 rouble 45 copecks, or three shillings 8 pence (say 78 cents) the pood [a pood is thirty-six pounds], delivery in this country October at Odessa. This is like carrying coals to Newcastle, since Odessa is the grain port of Russia, but poverty is a great leveler, even of the 'Imperial Great White Father of all the Russia.

JAY GOULD is having built a large number of barges, sufficient to transport 500,000 bushels of grain down the Mississippi river, and three large elevators at New Orleans. His agents in that city are Seligman, Heitman & Co. The object is to extend the grain carrying facilities of the Mississippi, not to divert trade from the Atlantic seaboard. There are times when grain awaiting transportation at St. Louis for the Southwest is stored there in such large quantities, owing to lack of carrying facilities, that loss is sustained by owners in consequence of the expense for storage. Shippers often have to wait a long time for barges, and the desire of the projector of the scheme is to furnish all who may require with sufficient vessels at any time they may be wanted.

CONTRIBUTORS to the Irish famine fund will be gratified to learn that in the year 1879 the total increase in savings bank deposits in Ireland, including interest due to depositors, was \$7,086,945, the largest increase in any one year on record. Only two counties show a decrease, but neither of these are in the distressed districts. In the counties where distress was greatest, Clare, Cork, Donegal, Galway, Kerry, Mayo, Roscommon and Sligo, the increase of capital was larger than in 1878 and larger in the last half of 1879 than in the first half. The direct increase in deposits, about \$450,000, was larger in Ireland in 1879 than in 1878 by one-half, and has been exceeded but three times in the past ten years. Nearly one-third of this addition to the deposits came from the counties where relief has been most widely distributed.

WE are under obligations to Mr. Frederick Trayser, of Milwaukee, for a handsome string of prairie chickens, shot by him on the broad and fertile fields of Dakota. Mr. Trayser has just returned from a two weeks trip in that enterprising young Territory and speaks volumes in its praise. He was almost persuaded to buy a wheat farm and become a resident there. Dakota has in the past two years been attracting great attention both near and far, and the reports of the immense yield from the large wheat farms has drawn thousands there to remain as permanent settlers. The extension of railroads in almost every direction throughout the Great Northwest will hasten to an immeasurable extent the settlement and improvement of the country and also greatly add to the commerce of Milwaukee and Chicago.

THE approaching presidential election is just now the all-absorbing topic of discussion with all classes of people, and candid, well-informed persons of all parties admit that the contest is going to be a close one. There are three parties in the field, two of which, the democratic and the republican, appear to have about equal strength, while the so-called greenback party are just strong enough in some sections of the country to hold the balance of power, and to an entirely disinterested party, the efforts of the other two parties to catch the greenback vote is somewhat amusing. The year of a presidential election is generally considered a poor one for business, but this time such is not the case. The volume of business in all sections of the country

shows a healthy increase, and 1880 and 1881 bid fair to be known in the future as years of prosperity. What the result of the election will be no one can tell, as yet, and the grain gamblers are already making their bets on it, as a relief by change from the routine of their every day business.

## Wisconsin Statute Law Relating to Grist Mills.

## OF THE RATES OF TOLL FOR GRINDING.

SECTION 1671. The owners or occupiers of all grist mills, moved by water, shall be entitled to one-eighth part of all wheat, rye or other grain ground and bolted, or ground and not bolted, and no more; and such owners or occupiers shall not be permitted to grind their own grain to the exclusion of other grists, so long as such mill is used and occupied as a grist mill.

SECTION 1672. The owner or occupier of any grist mill shall well and sufficiently grind the grain brought to his mill for that purpose, in due time, and in the order in which it shall be received, and shall be accountable for the safe-keeping of all grain received in such mill for the purpose of being ground therein, and shall deliver the same, when ground, or ground and bolted as the case may be, with the bag or casks in which it was brought, when demanded; but no owner or occupier of any millshall be compelled to grind for distilling, or for sale or merchant work, to the exclusion of his own grain.

SECTION 1673. Nothing contained in the last section shall be so construed as to charge the owner occupier of any mill for the loss of any grain, bag or cask which shall happen by robbery, fire or inevitable accident, without the fault of such owner or occupier, his agents or servants.

SECTION 1674. Every miller or owner or occupier of a grist mill, who shall not well and sufficiently grind any grain as aforesaid, or not in due turn, as the same shall be brought, or who shall exact or take more toll than is herein allowed, shall in every such case forfeit not less than three nor more than twenty dollars, and shall also be liable to the party injured in double the actual damages sustained by him.

THE MILLERS COLLEGE.—This subject has been somewhat discussed in millers' conventions and amongst private gatherings of millers for the last three or four years, but so far there has no tangible result followed that we are aware of. It is evident that most millers believe that the best school for learning the trade to their sons is the mill itself. There is no doubt but what they are about right. A graduation from the scientific course of almost any college in this country to start with, previous to entering the mill to learn the trade, will undoubtedly prove a great advantage. The student will be more apt to easily comprehend what is brought to his notice than he would without the knowledge and mental discipline gained by a scientific collegiate course. If the young man who contemplates becoming a first class miller can go through a scientific course at college and resist the temptation he may then have to become a professional man, and go thence to the mill, put on his overalls and go to work he will succeed.

A REMARKABLE CASE. Scarcely less astonishing than Dr. Tanner's recent feat of fasting, remarks the N. Y. *Evening Mail*, is the condition of a young lady, daughter of the Mayor of Grambske, a village near Bremen, who is said to have been fast asleep ever since the second week in January with the exception of a few hours of semi-wakefulness at intervals of from six to eight weeks. An interesting account of her extraordinary state is published in the *Hanover Courier*. It appears that she lies, plunged in a profound slumber and entirely unconscious of all that goes on about her, night and day reclining on her left side, warmly covered up and with a light gauze spread over her head. Nourishment, chiefly in a liquid form, is daily administered to her, which she swallows without awaking for a second. She is a pretty, slender girl, of a pallid complexion, but she does not lose in weight during her trances of from forty to sixty days, and when awake exhibits a cheerful disposition and an eager desire to perform such small household tasks as her strength enables her to fulfil. Her father is a well-to-do man, who has consulted several eminent medical men in the hope of discovering some remedy for his daughter's abnormal condition, which entails serious inconvenience and constant anxiety upon the other members of his family, but all efforts hitherto made to keep the unlucky girl awake have resulted in total failure.



## Watches.

## A FEW RULES AS TO SELECTING AND TAKING CARE OF THEM.

the following sensible remarks upon watches we are indebted to Mr. R. Houdlin, a Frenchman:

"We have always observed the embarrassment under which persons labor in buying a watch. In most cases, and for very obvious reasons, this piece of business assumes serious proportions. In fact, it is not a mere jewel or toy which fashion or caprice may cause us to continually change, but rather a faithful or devoted servant, which is long to be attached to our persons.

The watchmaker to whom we may go when purchasing a watch, should possess two essential qualities—honesty and knowledge; honesty alone affords no sufficient guarantee. In fact, the vendor who has not the requisite experience to be a judge of a watch is compelled to trust to others, who may deceive him, thus he may deceive you while deceiving himself.

The following advice may prove serviceable to those who have to rely on their own unassisted judgment in selecting a watch: First, while adhering to taste and elegance, choose watch thick enough. In a watch too thin or too little, the parts are too feeble, and have not sufficient space to work well. Watches as large as a penny piece, or those that are about as thin as a four-penny piece, are mere experiments of skill, which should rather be regarded as masterpieces of patience, from which there is no more vanity than utility to be derived. Second, avoid in watches that construction which fashion has often prescribed, but which good sense condemns—such as those that point the days of the month, and so forth. These extra pieces necessitate additional parts, which occasion friction, and encumber a space already too limited; though here it may be observed that complicated watches, such as chronographs, repeaters, etc., are now brought to a high state of perfection, at, of course, a correspondingly high cost. Third, do not allow yourself to be attracted by the supposed advantages of new escapements. In watches for ordinary purposes, the lever and the horizontal escapements are generally adopted as giving the best results. Fourth, the watchmaker who is conscientious will point out to you the limits beyond which a watch ceases to have the qualities necessary to go well. A watch procured for the design of its case may be covered or set with chasing and gems; it is then simply a jewel; but that which is bought for its utility ought to be as plain as possible, and this plainness itself is, as a rule, a distinguishing characteristic of its good quality.

We will now say a few words as to what we ought to do, and what we ought to avoid to preserve a watch in good condition. Having obtained a really serviceable article you should, in order to produce results, follow these rules: Wind up your watch every day at the same hour. This is generally done at the hour we retire to rest, or, perhaps, better still, at the hour we rise. Avoid putting a watch on a marble slab or near anything excessively cold. The sudden transition from heat to cold contracting the metal may sometimes cause the mainspring to break. Indeed, the cold coagulates the oil; and the wheel-work and pivots working less freely, affects the regularity of the timekeeper. When we lay our watch aside, we ought to slope it on a watchcase, so as to keep it nearly in the same position as it has in the pocket. In laying aside your watch be sure that it rests on its case, as by suspending it free, the action of the balance may cause oscillation, which may considerably interfere with its going. If you would keep your watch clean you must be quite sure that the case fits firmly, and never put it in any pocket but one made of leather. Those pockets which are lined with cloth, cotton or calico give, by the constant friction, a certain quantity of fluff, which enters most watches, even those the cases of which shut firmly. If the watch is not a "keyless" one, the key should be small, in order that we may feel the resistance of the stop-work; then we can stop in time without forcing anything. It is also necessary that the square of the key should correspond with the watch. If it be too large, it may in a short time cause the wind-up square to suffer from undue wear and tear, the rectifying of which is rather expensive. The hands of an ordinary watch can be turned backwards without much risk. It is, however, always better to move the hands forward to adjust your watch to correct time.

Watches, by reason of the fragile construction, and the variations to which they are liable, can, after all, only obtain a limited perfection in their performance; therefore we

must not be astonished to find them subject to certain variations. These variations, which are easy to correct, need not prejudice the quality of the watch, as will be proved by the following example: Two watches, we will suppose, have been put to the same time by an excellent regulator. At the end of a month one of these watches is a quarter of an hour too fast; the other exactly right to time. To which of these two watches would we give the preference? Perhaps to the one which is exactly right. But, in making such a choice, we nevertheless incur the risk of abandoning a good watch for a bad one. The first watch has, we assume, gained thirty seconds a day; and, according to this rate, it has gained a quarter of an hour in thirty days. What must be done to make this watch go well? Alter the regulator inside from fast to slow, or get a careful watchmaker to do it for you, thereby altering its daily rate. Let us now admit that the other watch has been affected during a month by irregular going, which has occasioned it sometimes to gain, at other times to lose to a certain extent daily. It may easily occur that at the end of a month this gaining and losing compensate each other, and by this means the watch indicates the exact hour at the time we look at it. Such a watch can never be relied on.

The fact is, that a watch which gains in a regular manner or loses in a regular manner is superior to any whose variation is uncertain; and where its variation comes to be familiar, the little companion may vie with the most delicately adjusted ship's chronometer.

A skilful watchmaker one day reasoned with a customer who complained of his watch: "You complain," said he, "that your watch gains a minute a month. Well, then you will congratulate yourself when you have heard me. You are aware that in your watch the balance, which is the regulator, makes five oscillations every second, which is 432,000 a day; so that your watch, exposed to all the vicissitudes which heat and cold occasion it, the varying weight of the air and the shaking to which it is subjected, has not varied more than a minute a month, or two seconds a day. It has only acquired with each vibration of the balance a variation of the 216,000th part of a second. Judge, then, what must be the extreme perfection of the mechanism of this watch."

A watch cannot go for an indefinite period without being repaired or cleaned. At the expiration of a certain time the oil dries up, dust accumulates and wear and tear are the inevitable results to the whole machinery, the functions becoming irregular and frequently ceasing to act altogether. A person possessing a watch of good quality, and desirous of preserving it as such, should have it cleaned every two years at least. But care should be taken to confide this cleaning or repairing to careful hands; an incapable workman may do great injury to a watch even of the simplest construction.

There is in the generality of watches a regulator for fast and slow, with a moveable index. The two words "Fast" and "Slow," engraved at each end of this regulator, leave no doubt as to which way the index should be moved in order to make the watch lose or gain. It is easily understood that, if the watch gain, the index should be pushed toward the slow; and when it loses, toward the fast. This operation should be performed with a good deal of care and attention, in consequence of the susceptibility and fragility of these regulating pieces. It would be impossible to give any information as to the effect existing between the degree of this regulator and the variations of the watch; it is, therefore, only by trial that we can arrive at the precise point at which to bring the time to its fullest accuracy. When a watch varies only a little, we content ourselves with pushing the index one degree. We then wait twenty-four hours to judge of the effect, and act according to the result obtained. In the event of the variation being greater, for instance, than ten minutes in advance in a day, we ought to push the index to the end of the "slow," even if we have to retrace our steps the next day; but if in this state the watch gained again, it would be necessary for the watchmaker himself to undertake the regulation of it.

It would be useless to attempt to correct a variation of one or two seconds in a day, or a minute in a month. Even supposing the going of such a watch did not vary more than a second a day, this would be perfect enough, as it would be extremely difficult to produce a correction slight enough for an error so trifling. The difference of time can generally be adjusted by a comparison with mean time as registered daily in nearly every large city; or, as we have already said, if the watch be regular in its habits of irregularity, it is virtually equivalent to a perfect time-keeper.

## Maryland's Oyster Trade.

Baltimore packs more oysters than any other city in the world. It is the centre of the packing trade, surpassing in that particular all other cities, and handling yearly more oysters than all the other packing points of Maryland and Virginia combined. During the season from September 1, 1879, to May 15, 1880, the number of vessels arriving in Baltimore loaded with oysters was 9,548, a daily average of 37 for 257 days, bringing 7,252,972 bushels, or an average cargo of 760 bushels. In addition there were 25,000 bushels by steamers to hotels, etc., making a total of 7,277,972 bushels, of which there were packed raw 3,769,353 bushels, hermetically sealed, 2,689,930 bushels, and used for city consumption, 818,680 bushels. There are 45 firms engaged in oyster packing in Baltimore, with a capital of \$2,388,300, occupying houses, etc., worth (estimated) \$1,360,968. During the summer these firms are engaged in fruit-packing. They employ 4,167 males and 2,460 females; total, 6,627, and during the season of 1878-9 paid to them in wages \$602,427. There were packed 6,450,292 bushels, requiring 25,546,780 tin cans and 929,614 wooden cases. The value of oysters packed, including shucking cans, etc., was \$3,517,349. For the cans \$794,919 was paid, and for the wooden cases, \$102,622.

Next to Baltimore, Crisfield is the most important packing point in the State, being literally built upon oysters, or, rather, upon oyster shells, which have been utilized to make new ground. The statistics of oyster-packing in Maryland for the 1879-80 season show that in Baltimore, Crisfield, Cambridge, Annapolis, Oxford, St. Michael's, and sundry small places in Somerset county, there are 98 firms engaged in packing: capital employed, \$2,492,355; value of buildings occupied, \$1,465,036; males employed, 6,179; females, 2,460; wages paid, \$777,779; bushels raw packed, 4,930,301; value, \$2,725,737; bushels steamed, 2,723,191; value, \$1,286,112; total bushels packed for season, 7,653,492; value, \$3,993,848; tin cans required, 25,546,780; cost, \$794,916; wooden cans, 929,614; cost, \$128,812.

Baltimore is the only place where tin cans and wooden cases are used to any extent, shipments elsewhere being principally in bulk. Of the 6,160 males employed in the raw trade, about three-fourths are colored, and the majority are very steady workmen, while the whites are more disposed to be idle and intemperate. The 2,460 females are all employed in the steam oyster-houses. They are mostly white girls of from 16 to 25 years, and almost without exception, of foreign birth or parentage. An industrious hand can make from 75 cents to \$1 a day. Men in the raw business can make from \$8 to \$15 a week. It is a coincidence that Mr. C. S. Maltby and Mr. A. Field, who respectively established the raw and the steam trade, were both originally from Connecticut, and both are still alive, the former in active business.

About \$250,000 is invested in the manufacture of cans for oysters, and 400 men are employed, whose wages for eight months amount to \$100,000. About 300 workmen, with wages amounting to \$156,000, are engaged in repairing oyster vessels. The city trade amounts to 828,680 bushels, the opening of which costs \$122,802, employing about 640 men; average wages, \$6 a week. About 500 men sell about the streets, with earnings amounting to \$96,000. The local consumption of towns on the Bay is 200,000 bushels, paying 150 men \$30,000. The total number of people engaged in the oyster business is 24,602; wages and earnings, \$3,825,5210 persons supported, 88,345; capital invested, \$6,245,876; total catch in Maryland last season was 10,579,012 bushels, 6,653,492 being packed, 2,021,840 being shipped out of the State, and the balance used for local consumption.—*Baltimore Sun.*

## Fooling a Chinaman.

A plump little Celestial, his almond eyes twinkling with delight and an extraordinary grin lighting up his yellow countenance, dropped in to witness the lottery drawing the other day.

He watched the blind-folded boys draw the numbers from the wheel with apparent interest, and bore the jokes of the crowd with evident good nature.

"Say, John, you washee that man's shirt?" asked one of the crowd, pointing to one of the benevolent-looking Commissioners.

"I washee heesee plenty shirties if I winee plize," said the bland Mongolian.

"Have you got a ticket, John?" replied the man in the crowd.

"Well, me think me habes," replied the Chinaman, drawing one from his pocket.

"Tlickee win?" he inquired.

The man looked at the number, and, scanning his list found that it had come in for a \$500 prize.

"Well, John," replied the man in the crowd, very innocently, "I think you've lost."

"Chinee man losee alle time," said the subject from the flowery empire, "gottsee no luckee. Gless tlow tlickee away."

"You needn't do that, John," said the man, with a patronizing air. "I'll give you a dime for it."

"Dime too lillee. Glimmee a dollar," said the Celestial.

"A dollar's too much for a ticket that can't win. We'll split the difference and call it half a dollar, eh?" said John's kind informant.

"Chinee man gottsee no luckee; Melican man takes alle monee. Takee the tlickee and glimme flo' bittee," and John passed over his ticket in exchange for the money.

When the Mongolian's grinning features had disappeared, the man chuckled and remarked that he had "got her this time."

"Let's see the ticket," asked one of his friends.

The man who had made the lucky investment handed the ticket over, when his friend exclaimed:

"Why, George, it was drawn last June."

"Is that so, asked the man, dumbfounded, the revelation that he had been duped dawning upon him. "Where is that lying rascal of a heathen Chinee who put up this job on me?"

But the Chinaman could nowhere be found, and the man had to be satisfied with the experience that he purchased with half a dollar.—*N. O. Picayune.*

## Boy Inventors.

Some of the most important inventions have been the work of mere boys. The invention of the valve motion to the steam engine was made by a boy. Watts left the engine in a very incomplete condition, from the fact that he had no way to open or close the valves, except by levers operated by the hand. He set up a large engine at one of the mines, and a boy was hired to work these valve levers; although this was not hard work, yet it required his constant attention. As he was working these levers he saw that parts of the engine moved in the right direction, and at the exact time that he had to open or close the valves. He procured a strong cord and made one end fast to the proper part of the engine, and the other end to the valve lever; the boy had the satisfaction of seeing the engine move off with perfect regularity of motion. A short time after the foreman came around and found the boy playing marbles at the door. Looking at the engine he soon saw the ingenuity of the boy, and also the advantages of so great an invention. Mr. Watts then carried out the boy's inventive genius in a practical form, and made the steam engine a perfect automatic working machine.

The power loom is said to be the invention of a farmers boy who had never seen or heard of such a thing. He whittled out one with his jackknife, and after he had got it all done, he, with great enthusiasm, showed it to his father, who at once kicked it all to pieces, saying that he would have no boy about him that would spend his time on such foolish things. The boy gathered up the pieces and laid them away. Soon after this his father bound him out as an apprentice to a blacksmith, about twelve miles from home. The boy was delighted with the idea of learning a trade, and he soon found that his new master was kind and took a lively interest in him. He had made a loom out of what he had left of the one his father had broken up, which he showed to his master. The blacksmith saw he had no common boy as an apprentice, and that the invention was a very valuable one. He immediately had a loom constructed under the supervision of the boy; it worked to their perfect satisfaction and the blacksmith furnished the means to manufacture the looms, the boy to receive one-half the profits. In about a year the blacksmith wrote to the boy's father that he should be at his house at a given time, and should bring with him a wealthy gentleman, who was the inventor of the celebrated power loom. You may be able to judge of the astonishment at the old home when his son was presented to him as the inventor who told him that his loom was the same as the model that he had kicked to pieces but a year before.

Among the orders received during the past week, by Simpson and Gault, for their Standard automatic grain scales are the following: Mosely & Motley, Rochester, N. Y. Hill, Landerbach & Co., South Bend. Sage Bros. and Co., Elkhorn, Ind. H. C. Cole & Co., Chester, Ill.



### Mathematics for Mechanics.

The saying that practice makes perfect is a pointed censure of the mechanic or any other man who thinks that the mere practice of his calling is all-sufficient. For the saying implies that something else is wanted besides practice, something which practice crowns and completes. That something is theory, or a knowledge of the principles on which the practice is based. All the practice in the world, without theory, will not make an intelligent mechanic.

Mechanical operations draw largely on the various departments of mathematics for their principles. Arithmetic, algebra, geometry and the calculus are constantly levied upon and often taxed to their utmost to supply the demands of mechanics. And these demands are sometimes so tremendous that even the vast resources of modern mathematics cannot satisfy them. The draughts of the physical on the abstract sciences frequently resemble what is known as "a run on the bank," when the funds run out and the bank has to close its doors. In other words, physical problems are constantly arising that baffle the profoundest mathematical analysis.

But while it is not necessary or possible for every one to be a great mathematician, every mechanic may get a vast deal that is needful for him from the field of mathematics, and that not very abstruse or difficult; and the mechanic who is wholly ignorant of mathematics is like a blind man groping his way. He may tread with confidence a familiar, well-beaten path, but the moment he swerves in the least from it, in any direction, he is at sea. If a mechanic would not wish to be a mere automaton, he should be fairly acquainted with the following subjects:

1. **ARITHMETIC.** This is learned by every one at the common school; but, in after life, without practice, its rules and processes easily slip from memory. Everybody, of course, should be familiar with the four common rules—addition, subtraction, multiplication and division—and there are certain other rules that a mechanic especially should be at all times up in. He should be perfectly at home in both vulgar and decimal fractions and be able to handle them like an expert. He may often have occasion to extract square and cube roots, and should be able to do so with facility.

2. **MENSURATION.** Every mechanic should know how to measure and calculate the areas of common plane figures, particularly those of the triangle and circle. He should also know how to measure and compute the surfaces and contents of the commonest solids, as the parallelopiped, pyramid, cone, cylinder and sphere.

3. **ALGEBRA.** He should know as much of algebra as to be able to solve simple and quadratic equations. He should also be able to use the binomial theorem. And especially he should be thoroughly familiar with algebraic formulae and transformations, as he will constantly meet them in books if he attempts reading; and he should be able readily to calculate the value of any expression when the letters in it are assigned numerical values.

4. **LOGARITHMS.** Without necessarily being acquainted with their theory and construction, he ought to be able to use a table of logarithms.

5. **GEOMETRY.** A knowledge of the principal properties of plane figures would be highly useful; also an acquaintance with the geometry of the most familiar solids, as the cylinder, sphere, etc.

6. **TRIGONOMETRY.** The meaning, at least, of the terms sine, cosine, tangent, etc., should be understood; also the solution of plane triangles.

7. **THE CALCULUS.** The differential and integral calculus is the powerful machine with which mathematics achieves its greatest wonders. It is commonly treated as something too lefty, too sublimated, to be within the comprehension of ordinary people. This is a mistake. The radical and essential ideas of this great two-fold calculus are easy of comprehension; and, while it covers an illimitable field, there are parts of it—and those the most useful—that can readily be mastered by any one with a very small stock of algebra and geometry at command. No mechanic with such a moderate equipment need dread the calculus. He can acquire some of its best formulae with ease, and should by all means do so. The notation and processes of the calculus pervade all scientific books of any account, and without a knowledge of such notation and processes, the books will be as unintelligible as the hieroglyphics of Egypt.

The facilities for acquiring knowledge in these days are numerous, and no one can plead

in excuse for his ignorance that he has not opportunities. If he is debarred by age or occupation from attending day school, there are night schools which he can attend, if he is not too lazy, when his day's work is over. At these schools he can study arithmetic and some other things that will make a good basis to build other subjects upon, not taught in these elementary places of learning. But if he can afford it, let him by all means have a competent private teacher; he will find it the best economy.—*Ill. Scientific News.*

### Curious Theory of Bathing Accidents.

A naval officer writes to the London *Standard* as follows: Being in an out-of-the-way place, I saw only your editorial remarks on bathing accidents recently. I ask for space in your paper to relate what happened to myself some years back. The ship I belonged to was lying for a long time in Aden harbor. Some of the men went to play cricket every evening. To save the trouble of sending a large boat with them we used to send our clothes on shore in the jolly boat, and the greater portion of the men would jump overboard and swim to the shore. Of course we used to race to reach the shore first; one evening while so doing I had a tug to win, and got very much out of breath, and began to breathe through my mouth. A puff of wind came from the hills and raised a ripple, little globules of water flying along the surface. Breathing hard I sucked a globule into my throat, and immediately had the suffocating sensation that occurs when a glass of water is said to "go the wrong way." I could neither get my breath in nor any out, and I soon began to feel I was dying on the top of the water. There must have been a dozen men close to me, but I could not speak, much less call to them. I kept swimming on for the shore. In about thirty seconds my senses began to leave me. I ceased swimming, and my legs went down, when, luckily for me, they touched the bottom; a violent jump helped me to cough up the drop of water, I staggered on shore, and fell quite exhausted on the beach, much to the surprise of all the men with me. A man taken with palpitation of the heart can stop swimming and call out, unless he is struck with apoplexy; but a man with a drop of water in his windpipe cannot speak, but goes on swimming strongly till a few seconds before his death. I have paid much attention to accounts of bathing accidents, and have invariably found that, although the body of a person supposed to be seized with cramp is picked up a minute or two afterward, no recovery takes place. The remedy, or rather the prevention, of such a sudden death is very easy—only breathe through the nose while swimming, keeping the mouth closed.

### She Knew All About It.

Just about midnight the other night, four men in a Detroit saloon sat looking at a fifth. The fifth one was drunker than the other four. While all men where created equal, some men get drunk twice as fast as others. "It will never do to send him home in this condition," said one of the four after a long silence. "No, it would break his wife's heart" added a second. "But we can't leave him here, and if we turn him out the police will run him in," observed a third. "I have been thinking," mused a fourth. "He has a telephone in his house. Here is one here. I will write it my painful duty to inform his waiting and anxious wife that he won't be home to-night." He went to the telephone, got her call, and then began: "Mrs. Blank. I desire to communicate to you regarding your husband." "Well, go ahead," "He is in town here." "I know that much." "In descending the stairs leading from the lodge-room he fell and sprained his ankle." "Are you sure it wasn't his neck?" "It is not a serious sprain, but we think it is better to let him lie on the sofa in the anteroom until morning. Rest assured that he will have the best of care. We are doing ev—" "Say," broke in a sharp voice, "You bundle him into a wagon and drive him up here, where I can keep him hidden until that drunkenness is off! He won't be sober before to-morrow night!" "My dear mad—" "Get out! If he's sleepy drunk put water on his head. That's the way I always do." "Will you let me inform you that—" "No, sir, I won't! Throw water on his head, get him into some vehicle and rattle him right up here, for it's most midnight now and it will take me half an hour to get his boots off and punch him up stairs! Remember—pour water on his head and yell fire in his ear!"—*Detroit Free Press.*

The United States, while it contains less sixth of the population of Europe, has four fifths as many swine, a third as many cattle, and a fifth as many sheep as are in all of the European countries together.

### His Son Jim's Bay Mare.

"I've come all the way in from Canaan to git a little law," said a man with a horsewhip under his arm, blue overalls in his boots, and a gray, stubby beard on his face, as he entered the Allen house reading-room yesterday, where a number of the boys were talking politics. "Maybe some o' you fellars kin give me the correct thing without the dickerin' with a lawyer."

The speaker was a well-known farmer of the southern part of the county. He and his son Jim are noted for their sharpness at a bargain and a readiness to trade horses, cows, wagons, farms, or anything that belongs to them, at any and all times a customer may present himself. Jim lives on a farm a mile from the old man's.

"Ye see, boys," continued the speaker, "my boy Jim had a bay mare that he traded a yearlin' bull and a cross-tooth harrow fur. She was a critter, an' no mistake. I wanted that mare the wust kind, an' made Jim a heap o' good offers fur her, but he wouldn't bite. Last Wednesday he came to my house kind o' careless like, and sot down on the front stoop. I was a choppin' kindlin' wood fur mornin'. Jim sot there a lookin' up an' down the road whistlin' the Sweet By and By kind o' to himself. When I carried in my kindlin' I sot down on the stoop by him."

"Jim," I sez, "you better let your old father have that bay mare o' yourn," sez I.

"Jim had just started the second verse of the Sweet By an' By, but he whistled her all the way through afore he answered me.

"I been a thinkin' o' lettin' you have the mare, pap," sez he, "seen's you got yer heart sot on her so," sez he, "perridin' we kin git up a dicker," sez he.

"Jim had been goin' to camp-meetin' pooty steady fur a week back, an' I heerd he was gittin' serious. He hadn't been whistlin' nothin' but hymn tunes for two or three days, and when he came around so nice on the mare question, I made up my mind that me an' the old woman would see him jinin' the mourners afore long.

"Jim, I can stand \$80 for the mare," sez I.

"Jim looked up the road and hummed a verse of 'Come ye sinners poor and needy.' Then he sez:

"Pap," sez he, "I'll tell you what I'll do. Give me a hundred dollars," sez he, "an' throw in them two Berkshire pigs, an' the mare is yourn," sez he, "jest as she is."

"A bargain!" sez I. "The pigs is yours, an' I'll be down after the mare to-morrow," sez I.

"I counted out the hundred an' give it to him. He druv the pigs home with him. They was worth \$15 apiece, easy. I could hear Jim whistlin' 'Hold the Fort' till he got half a mile away.

"Jemima," I sez to the old woman, "Jemima," sez I, "I never thought Jim 'd git pious, did you? But I've got the bay mare," sez I; "an' what the old boy Jim was thinkin' of I can't see. She's worth two hundred and fifty any day in the week," I sez. "Relig'n is makin' a fool o' Jim," sez I.

"Well, next mornin' early I went down to Jim's to git the mare. Jim had gone to town. I see his wife.

"I've bought the bay mare, Nancy," I sez. "Yes, I know ye have," sez Nancy, grinnin' all over her face.

"Where is she?" I sez.

"She's down in the stone lot," sez Nancy,

grinnin' more'n ever.

"I thought it was funny that the mare should be down in the stone lot, but I went down to find her. Boys, I found her. She was lyin' behind a big stone heap leader'n a door-nail. I went back to the house.

"Why, Nancy," sez I, "the bay mare's dead!"

"O yes," sez Nancy, laughin' as if she'd split, "she died yesterday mornin' with the colic," sez she.

"Boys, for a minute I was mad. Then I come to, an' sez to myself, 'I'll be glued if I don't git the mare's shoes, anyhow,' sez I. So I went back to the stone lot to draw her shoes off. Boys, I'll divide my farm up between ye if Jim hadn't drawn them shoes hisself, an' the mare's feet was as bare as when she was born.

"Now, I ain't no ways mad at Jim, boys, for it was a fair an' square dicker, an' it shows there's stuff in him; only be mought a left the shoes on the mare. What I want to know is, can't I git back on the camp-meetin' folks some way for damages? If it hadn't a ben fur them hymn tunes Jim larnt at the meetin' I'd a ben lookin' out fur him. But they throwed me way off my guard. The way I look at it is that the camp-meetin' society is responsible for me losin' my hundred dollars and two fifteen dollar pigs. Can't I git back on 'em fur trespass or false pretenses, or excessory afore the fact, or uthin'? Can't I do it, boys?"

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